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**TITLE 327 WATER POLLUTION CONTROL BOARD**

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**FINDINGS AND DETERMINATION OF THE COMMISSIONER  
PURSUANT TO [IC 13-14-9-7](#) AND SECOND NOTICE OF COMMENT PERIOD**  
LSA Document #11-667

**DEVELOPMENT OF AMENDMENTS TO RULES CONCERNING DRINKING WATER STANDARDS AT [327 IAC 8-2](#), GROUND WATER STANDARDS AT [327 IAC 8-2.3](#), AND DISINFECTANTS AND DISINFECTION RULES AT [327 IAC 8-2.5](#)**

**PURPOSE OF NOTICE**

The Indiana Department of Environmental Management (IDEM) has developed draft rule language for amendments to drinking water standards at [327 IAC 8-2](#), ground water standards at [327 IAC 8-2.3](#), and disinfectants and disinfection rules at [327 IAC 8-2.5](#). The purpose of this notice is to seek public comment on the draft rule, including suggestions for specific language to be included in the rule. IDEM seeks comment on the affected citations listed and any other provisions of Title 327 that may be affected by this rulemaking.

**CITATIONS AFFECTED:** [327 IAC 8-2](#); [327 IAC 8-2.3](#); [327 IAC 8-2.5](#).

**AUTHORITY:** [IC 13-13-5](#); [IC 13-14-8](#); [IC 13-14-9](#); [IC 13-18](#).

**STATUTORY REQUIREMENTS**

[IC 13-14-9-7](#) recognizes that under certain circumstances it may be appropriate to reduce the number of public comment periods routinely provided. In cases where the commissioner determines that the rulemaking policy alternatives available to IDEM are so limited that the notice of first public comment period would provide no substantial benefit to the environment or persons to be regulated or otherwise affected by the proposed rule, IDEM may forego this comment period and proceed directly to the notice of second public comment period.

If the commissioner makes the determination of limited rulemaking policy alternatives required by [IC 13-14-9-7](#), the commissioner shall prepare written findings and include them in the second notice of public comment period published in the Indiana Register. This document constitutes the commissioner's written findings pursuant to [IC 13-14-9-7](#).

The statute provides for this shortened rulemaking process if the commissioner determines that "the rulemaking policy alternatives available to the department are so limited that the public notice and comment period under [\[IC 13-14-9-3\]](#)... would provide no substantial benefit to:

- (1) the environment; or
- (2) persons to be regulated or otherwise affected by the proposed rule."

**BACKGROUND**

In the draft rule language amending drinking water standards at [327 IAC 8-2](#), ground water standards at [327 IAC 8-2.3](#), and disinfectants and disinfection rules at [327 IAC 8-2.5](#), IDEM is updating its rule per changes made by the Environmental Protection Agency (EPA) to the National Primary Drinking Water Regulations, more specifically, a minor correction to the Stage 2 Disinfection and Disinfection Byproducts Rule and Changes in References to Analytical Methods (74 FR 30953, June 29, 2009). EPA promulgated the Stage 2 Disinfection and Disinfection Byproducts Rule on January 4, 2006. A requirement for ground water systems serving 500-9,999 people was unintentionally excluded from the final federal rule. As a result, the rule allowed for less routine compliance monitoring than intended for this category of public water systems (PWSs). These PWSs should have been required to monitor for both total trihalomethanes (TTHM) and haloacetic acids (HAA5) concentrations at two locations. Due to the error, the water systems were only required to monitor for either TTHM or HAA5 at two locations. EPA has also made minor, unrelated changes in the regulations by adding references to the list of analytical methods approved under the expedited approval process, removing references to outdated methods, and specifying a new source for the publication titled "Technical Notes on Drinking Water Methods". In [327 IAC 8-2.5-12](#) Routine monitoring; Stage 2 disinfection byproducts requirements, IDEM is adding footnote 1 language to the table as it was inadvertently left out of the prior rulemaking.

At the time EPA published the Stage 2 Disinfection rule at 74 FR 30953, IDEM had already drafted rule language for the affected sections for a different rulemaking, which had a deadline to be completed. IDEM completed that rulemaking (LSA Document #08-198) before initiating this rulemaking. IDEM's rule already allowed systems and labs to use any methods approved by IDEM and EPA, and the other changes made did not affect any system until April 2010.

**[IC 13-14-9-4](#) Identification of Restrictions and Requirements Not Imposed under Federal Law**

No element of the draft rule imposes either a restriction or a requirement on persons to whom the draft rule applies that is not imposed under federal law.

### **Potential Fiscal Impact**

Since Indiana is mirroring current federal rules by correcting an initial oversight by U.S. EPA, there is no additional fiscal impact beyond that was imposed by the federal rule. In the Stage 2 Disinfection and Disinfection Byproducts Rule Economic Analysis (EPA 815-R-05-010) and in the Information Correction Rule Supporting Statement (71 FR 429), EPA based the estimate of burden for these systems using the intended monitoring frequency. Population-based monitoring is discussed at length in the final Stage 2 DBPR (71 FR 456) and the additional costs for monitoring by ground water systems serving 500-9,999 people are included (71 FR 456).

### **Public Participation and Workgroup Information**

No workgroup is planned for the rulemaking. If you feel that a workgroup or other informal discussion on the rule is appropriate, please contact Kiran Verma, Rules Development Branch, Office of Legal Counsel at (317) 232-8899 or (800) 451-6021 (in Indiana).

### **Small Business Assistance Information**

IDEM established a compliance and technical assistance (CTAP) program under [IC 13-28-3](#). The program provides assistance to small businesses and information regarding compliance with environmental regulations. In accordance with [IC 13-28-3](#) and [IC 13-28-5](#), there is a small business assistance program ombudsman to provide a point of contact for small businesses affected by environmental regulations. Information on the CTAP program, the monthly CTAP newsletter, and other resources available can be found at:

[www.in.gov/idem/ctap](http://www.in.gov/idem/ctap)

For purposes of [IC 4-22-2-28.1](#), the Small Business Regulatory Coordinator for this rule is:

Alison Beumer  
IDEM Small Business Regulatory Coordinator  
MC 60-04 IGCS W041  
100 North Senate Avenue  
Indianapolis, IN 46204-2251  
(317) 232-8172 or (800) 988-7901  
[ctap@idem.in.gov](mailto:ctap@idem.in.gov)

For purposes of [IC 4-22-2-28.1](#), the Small Business Ombudsman designated by [IC 5-28-17-5](#) is:

Eric P. Shields  
Indiana Economic Development Corporation  
One North Capitol, Suite 700  
Indianapolis, IN 46204  
(317) 234-3997  
[smallbizombudsman@iedc.in.gov](mailto:smallbizombudsman@iedc.in.gov)

Resources available to regulated entities through the small business ombudsman include the ombudsman's duties stated in [IC 5-28-17-5](#), specifically [IC 5-28-17-5\(9\)](#), investigating and attempting to resolve any matter regarding compliance by a small business with a law, rule, or policy administered by a state agency, either as a party to a proceeding or as a mediator.

The Small Business Assistance Program Ombudsman is:

Brad Baughn  
IDEM Small Business Assistance Program Ombudsman  
MC 50-01 IGCN 1301  
100 North Senate Avenue  
Indianapolis, IN 46204-2251  
(317) 234-3386 or (800) 451-6027  
[bbaughn@idem.in.gov](mailto:bbaughn@idem.in.gov)

### **FINDINGS**

The commissioner of IDEM has prepared written findings regarding rulemaking on amendments to drinking water standards at [327 IAC 8-2](#), ground water standards at [327 IAC 8-2.3](#), and disinfectants and disinfection rules at [327 IAC 8-2.5](#). These findings are prepared under [IC 13-14-9-7](#) and are as follows:

- (1) The reason for using the Section 7 process of the rulemaking is due to a correction to comply with federal rules. IDEM's rule already allowed systems and laboratories to use any methods approved by IDEM and EPA, so the methods listed in FR 74 30953 could already be used by the entities, and the other changes made by EPA do not affect any system until April 2012.
- (2) I have determined that under the specific circumstances pertaining to this rule, the rulemaking policy alternatives are so limited that the public notice and comment period provided in the first notice of public comment period would provide no substantial benefit to the environment or to persons to be regulated or otherwise affected by the rule.
- (3) The draft rule is hereby incorporated into these findings.

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Thomas W. Easterly

## REQUEST FOR PUBLIC COMMENTS

This notice requests the submission of comments on the draft rule language, including suggestions for specific revisions to language to be contained in the draft rule. Comments may be submitted in one of the following ways:

- (1) By mail or common carrier to the following address:  
LSA Document #11-667 (Drinking water standards, ground water standards, and disinfectants and disinfection rules)  
Janet Pittman  
Rules Development Branch  
Office of Legal Counsel  
Indiana Department of Environmental Management  
100 North Senate Avenue  
MC 65-45  
Indianapolis, Indiana 46204-2251
- (2) By facsimile to (317) 232-5970. Please confirm the timely receipt of your faxed comments by calling the Rules Development Branch at (317) 232-8922.
- (3) By electronic mail to [kverma@idem.in.gov](mailto:kverma@idem.in.gov). To confirm timely delivery of your comments, please request a document receipt when you send the electronic mail. **PLEASE NOTE: Electronic mail comments WILL NOT be considered part of the official written comment period unless they are sent to the address indicated in this notice.**
- (4) Hand delivered to the receptionist on duty at the thirteenth floor reception desk, Office of Legal Counsel, Indiana Government Center North, 100 North Senate Avenue, Indianapolis, Indiana.

Regardless of the delivery method used, in order to properly identify each comment with the rulemaking action it is intended to address, each comment document must clearly specify the LSA document number of the rulemaking you are commenting on and the name of the commentor and commentor's contact information.

## COMMENT PERIOD DEADLINE

Comments must be postmarked, faxed, or hand delivered by December 2, 2011.

Additional information regarding this action may be obtained from Kiran Verma, Rules Development Branch, Office of Legal Counsel, (317) 232-8899 or (800) 451-6027 (in Indiana).

## DRAFT RULE

SECTION 1. [327 IAC 8-2-4.2](#) IS AMENDED TO READ AS FOLLOWS:

### [327 IAC 8-2-4.2](#) Analytical methods for inorganic chemical testing

**Authority:** [IC 13-13-5](#); [IC 13-14-8-7](#); [IC 13-14-9](#); [IC 13-18-3](#); [IC 13-18-16](#)

**Affected:** [IC 13-11-2](#); [IC 13-14-8](#); [IC 13-18-1](#); [IC 13-18-2](#)

Sec. 4.2. (a) Analyses conducted to determine compliance with section 4 of this rule shall be made in accordance with one (1) of the following methods\* for each contaminant **or with the alternative methods listed in Appendix A to Subpart C of 40 CFR 141. Criteria for analyzing arsenic, barium, beryllium, cadmium, calcium, chromium, copper, lead, nickel, selenium, sodium, and thallium with digestion or directly without digestion, and other analytical test procedures are contained in Technical Notes on Drinking Water Methods, EPA-600/R-94-173, October 1994. This document is available from the National Service Center for Environmental Publications (NSCEP), P.O. Box 42419, Cincinnati, OH 45242-0419 or <http://www.epa.gov/nscep/>:**

- (1) Antimony as follows:
  - (A) Atomic absorption<sup>1</sup>; furnace, Method 3113B\*.
  - (B) Atomic absorption; platform, Method 200.9\*.
  - (C) ICP-mass spectrometry, Method 200.8\*.
  - (D) Hydride-atomic absorption, Method D 3697-92\*.
- (2) Arsenic\* as follows:
  - (A) Atomic absorption; furnace, Method D 2972-97C\*, **Method D 2972-03C\*, Method 3113 B-99\***, or Method 3113B\*.
  - (B) Hydride-atomic adsorption, Method D 2972-97B\*, **Method 1972-03C, Method 3114 B-97\***, or Method

- 3114B\*.
- (C) Atomic absorption, platform<sup>1</sup>, Method 200.9<sup>2\*</sup>.
- (D) Inductively coupled plasma technique<sup>4\*</sup>, Method 200.7<sup>2-3\*</sup> or Method 3120B<sup>3\*</sup>.
- (E) (D) ICP-mass spectrometry, Method 200.8<sup>2\*</sup>.
- (3) Asbestos, transmission electron microscopy, Method 100.1\* or Method 100.2\*.
- (4) Barium as follows:
- (A) Atomic absorption; furnace, Method 3113B\*.
- (B) Atomic absorption; direct, Method 3111D\*.
- (C) Inductively coupled plasma, Method 200.7\* or Method 3120B\*.
- (D) ICP-mass spectrometry, Method 200.8\*.
- (5) Beryllium as follows:
- (A) Atomic absorption; furnace, Method D 3645-97B or Method 3113B.
- (B) Atomic absorption; platform, Method 200.9\*.
- (C) Inductively coupled plasma, Method 200.7\* or Method 3120B\*.
- (D) ICP-mass spectrometry, Method 200.8.
- (6) Cadmium as follows:
- (A) Atomic absorption; furnace, Method 3113B\*.
- (B) Inductively coupled plasma<sup>1</sup>, Method 200.7\*.
- (C) ICP-mass spectrometry, Method 200.8\*.
- (D) Atomic absorption; platform, Method 200.9\*.
- (7) Chromium as follows:
- (A) Atomic absorption; furnace, Method 3113B\*.
- (B) Inductively coupled plasma, Method 200.7\* or Method 3120B\*.
- (C) ICP-mass spectrometry, Method 200.8\*.
- (D) Atomic absorption; platform, Method 200.9\*.
- (8) Cyanide as follows:
- (A) Manual distillation followed by:
- (i) Spectrophotometric; amenable, Method D 2036-98B\* or Method 4500-CN-G\*.
- (ii) Spectrophotometric; manual, D 2036-98A\*, Method 4500-CN-E\*, or Method I-3300-85\*.
- (iii) Spectrophotometric; semiautomated, Method 335.4\*.
- (iv) Method 4500-CN-C\*.
- (v) Method D 2036-98A\*.
- (B) Selective electrode, Method 4500-CN-F\*.
- (C) UV/Distillation/Spectrophotometric; Method Kelada 01.
- (D) Distillation/Spectrophotometric; Method QuikChem 10-204-00-1-X.
- (9) Fluoride as follows:
- (A) Ion chromatography, Method 300.0\*, Method D 4327-97\*, or Method 4110B\*.
- (B) Manual distillation; color. SPADNS, Method 4500F<sup>-</sup>B, D\*.
- (C) Manual electrode, Method D 1179-93B\* or Method 4500F<sup>-</sup>C\*.
- (D) Automated electrode, Method 380-75WE\*.
- (E) Automated alizarin, Method 4500F<sup>-</sup>E\* or Method 129-71W\*.
- (10) Mercury as follows:
- (A) Manual cold vapor, Method 245.1, Method D 3223-91\*, or Method 3112B\*.
- (B) Automated cold vapor, Method 245.2\*.
- (C) ICP-mass spectrometry, Method 200.8\*.
- (11) Nickel as follows:
- (A) Atomic absorption; furnace, Method 3113B\*.
- (B) Atomic absorption; platform, Method 200.9.
- (C) Atomic absorption; direct, Method 3111B\*.
- (D) Inductively coupled plasma, Method 200.7\* or Method 3120B\*.
- (E) ICP-mass spectrometry, Method 200.8\*.
- (12) Nitrate as follows:
- (A) Manual cadmium reduction, Method D 3867-90B\* or Method 4500-NO<sub>3</sub><sup>-</sup>-E\*.
- (B) Automated cadmium reduction, Method 353.2\*, Method D 3867-90A\*, or Method 4500-NO<sub>3</sub><sup>-</sup>-F\*.
- (C) Ion selective electrode, Method 4500-NO<sub>3</sub><sup>-</sup>-D\* or Method 601\*.
- (D) Ion chromatography, Method 300.0\*, Method D 4327-97\*, Method 4110B\*, or Method B-1011\*.
- (13) Nitrite as follows:
- (A) Ion chromatography, Method 300.0\*, Method D 4327-97\*, Method 4110B\*, or Method B-1011\*.
- (B) Automated cadmium reduction, Method 353.2\*, Method D 3867-90A\*, or Method 4500-NO<sub>3</sub><sup>-</sup>-F\*.
- (C) Manual cadmium reduction, Method D 3867-90B\* or Method 4500-NO<sub>3</sub><sup>-</sup>-E\*.
- (D) Spectrophotometric, Method 4500-NO<sub>2</sub><sup>-</sup>-B\*.

(14) Selenium as follows:

- (A) Hydride-atomic absorption, Method D 3859-98A\* or Method 3114B\*.
- (B) ICP-mass spectrophotometry, Method 200.8\*.
- (C) Atomic absorption; platform, Method 200.9\*.
- (D) Atomic absorption; furnace, Method D 3859-98B\* or Method 3113B\*.

(15) Thallium as follows:

- (A) Atomic absorption; platform<sup>1</sup>, Method 200.9\*.
- (B) ICP-mass spectrometry, Method 200.8\*.

<sup>1</sup>Because MDLs reported in EPA Methods 200.7 and 200.9 were determined using a 2× preconcentration step during sample digestion, MDLs determined when samples are analyzed by direct analysis, that is, no sample digestion, will be higher. For direct analysis of cadmium and arsenic by Method 200.7, and arsenic by Method 3120-B, sample preconcentration using pneumatic nebulization may be required to achieve lower detection limits. Preconcentration may also be required for direct analysis of antimony and thallium by Method 200.9 and antimony by Method 3113 B unless multiple in-furnace depositions are made.

<sup>2</sup>If ultrasonic nebulization is used in the determination of arsenic by Method 200.7, 200.8, or 3120-B, the arsenic must be in the pentavalent state to provide uniform signal response. For Methods 200.7 and 3120-B, both samples and standards must be diluted in the same mixed acid matrix concentration of nitric and hydrochloric acid with the addition of one hundred (100) µL of thirty percent (30%) hydrogen peroxide per one hundred (100) mL of solution. For direct analysis of arsenic with Method 200.8 using ultrasonic nebulization, samples and standards must contain one (1) mg/l of sodium hypochlorite.

<sup>3</sup>After January 1, 2006, analytical methods using the ICP-AES technology when analyzing for arsenic may not be used because the detection limits for these methods are eight thousandths (0.008) mg/l or higher. This restriction means that the two (2) ICP-AES methods (Methods 200.7 and 3120-B) approved for use for the MCL of five hundredths (0.05) mg/l may not be used for compliance determinations for the revised MCL of ten thousandths (0.010) mg/l. However, prior to 2006, a system may have compliance samples analyzed with these less sensitive methods.

(b) Analysis under this section shall only be conducted by laboratories that have been certified by EPA or the commissioner. Laboratories may conduct sample analyses under provisional certification until January 1, 1996. To receive certification to conduct analyses for antimony, arsenic, asbestos, barium, beryllium, cadmium, chromium, cyanide, fluoride, mercury, nickel, nitrate, nitrite, selenium, and thallium, the laboratory must do the following:

- (1) Successfully analyze PE samples provided by EPA, the commissioner, or by a third party with approval of the EPA or the commissioner, at least once a year.
- (2) For each contaminant that has been included in the PE sample and for each method for which the laboratory desires certification achieve quantitative results on the analyses that are within the following acceptance limits:

Contaminant	Acceptance Limit
Antimony	±30% at ≥0.006 mg/l
Arsenic <sup>1</sup>	± 30% at ≥ 0.003 mg/l
Asbestos	2 standard deviations based on study statistics
Barium	±15% at ≥0.15 mg/l
Beryllium	±15% at ≥0.001 mg/l
Cadmium	±20% at ≥0.002 mg/l
Chromium	±15% at ≥0.01 mg/l
Cyanide	±25% at ≥0.1 mg/l
Fluoride	±10% at ≥1 to 10 mg/l
Mercury	±30% at ≥0.0005 mg/l
Nickel	±15% at ≥0.01 mg/l
Nitrate	±10% at ≥0.4 mg/l
Nitrite	±15% at ≥0.4 mg/l
Selenium	±20% at ≥0.01 mg/l
Thallium	±30% at ≥0.002 mg/l

<sup>1</sup>Acceptance limit effective January 1, 2006. Until then, limit should be two (2) standard deviations based on study statistics.

\*Methods referenced in this section may be obtained as follows:

- (1) Method 245.2, "Methods for Chemical Analysis of Water and Wastes", EPA-600/4-79-020, March 1983, available at NTIS, PB84-128677.
- (2) Methods 200.8, 200.9, 200.7, and 245.1 may be found in "Methods for the Determination of Metals in Environmental Samples—Supplement I", EPA-600/94-111, May 1994, available from NTIS, PB95-125472, 800-553-6847.
- (3) Methods D 3697-92, D 1179-93B, D 3223-91, D 3867-90A, D 3867-90B, D 3859-93A, and D 3859-93B, may be found in "Annual Book of ASTM Standards", 1994 and 1996, Vols. 11.01 and 11.02, American Society for Testing and Materials, available from the American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, Pennsylvania 19428. Any year containing the cited version of the method may be used.
- (4) Methods D 2972-97C, D 2972-97B, D 3645-97B, D 2036-98A, D 2036-98B, D 4327-97, D 3859-98A, and D 3859-98B may be found in the "Annual Book of ASTM Standards, 1999, Vols. 11.01 and 11.02, American Society for Testing and Materials, available from the American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, Pennsylvania 19428. Any year containing the cited version of the method may be used.
- (5) Methods 3113B, 3114B, 3111D, and 3111B may be found in "18th Edition of Standard Methods for the Examination of Water and Wastewater", 1992, or "19th Edition of Standard Methods for the Examination of Water and Wastewater", 1995, American Public Health Association, available from the American Public Health Association, 1015 Fifteenth Street NW, Washington, D.C. 20005. Either edition may be used.
- (6) Methods 3120B, 4500-CN<sup>-</sup>C, 4500-CN<sup>-</sup>G, 4500-CN<sup>-</sup>E, 4500-CN<sup>-</sup>F, 4110B, 4500F<sup>-</sup>B, 4500-F-D, 4500F<sup>-</sup>C, 4500F<sup>-</sup>E, 3112B, 4500-NO<sub>3</sub><sup>-</sup>-F, 4500-NO<sub>3</sub><sup>-</sup>-D, 4500-NO<sub>3</sub><sup>-</sup>-E, and 4500-NO<sub>3</sub><sup>-</sup>-B may be found in "18th Edition of Standard Methods for the Examination of Water and Wastewater", 1992,<sup>2</sup> "19th Edition of Standard Methods for the Examination of Water and Wastewater", 1995, or "20th Edition of Standard Methods for the Examination of Water and Wastewater", 1998, American Public Health Association, available from the American Public Health Association, 1015 Fifteenth Street NW, Washington, D.C. 20005. The cited methods published in any of the three (3) editions may be used.
- (7) Method I-3300-85 may be found in Techniques of Water Resources Investigation of the U.S. Geological Survey, Book 5, Chapter A-1, 3rd Edition, 1989, available from Information Services, U.S. Geological Survey, Federal Center, Box 25286, Denver, Colorado 80225-0425.
- (8) Methods 335.4, 300.0, and 353.2 may be found in "Methods for the Determination of Inorganic Substances in Environmental Samples", EPA-600/R-93-100, August 1993, available from NTIS, PB94-120821.
- (9) Method 601 may be found in Technical Bulletin 601 "Standard Method of Test for Nitrate in Drinking Water", July 1994, PN 221890-001, Analytical Technology, Inc., available from ATI Orion, 529 Main Street, Boston, Massachusetts 02129.
- (10) Method B-1011 may be found in "Waters Test Method for Determination of Nitrate/Nitrite in Water Using Single Column Ion Chromatography", August 1987, available from Waters Corporation, 34 Maple Street, Milford, Massachusetts 01757.
- (11) Method 100.1 may be found in "Analytical Methods for Determination of Asbestos Fibers in Water", EPA-600/4-83-043, EPA, September 1983, available from NTIS, PB83-260471.
- (12) Method 100.2 may be found in "Determination of Asbestos Structure Over 10-µm in Length in Drinking Water", EPA-600/R-94-134, June 1994, available from NTIS, PB94-201902.
- (13) Method 129-71W may be found in "Fluoride in Water and Wastewater", December 1972, Technicon Industrial Systems, available from Bran & Luebbe, 1025 Busch Parkway, Buffalo Grove, Illinois 60089.
- (14) Method 380-75WE may be found in "Fluoride in Water and Wastewater", February 1976, Technicon Industrial Systems, available from Bran & Luebbe, 1025 Busch Parkway, Buffalo Grove, Illinois 60089.
- (15) Method Kelada 01 may be found in "Kelada Automated Test Methods for Total Cyanide, Acid Dissolvable Cyanide, and Thiocyanate", Rev 1.2, August 2001, EPA 821-B-01-099, available from the National Technical Information Service (NTIS), PB 2001-108275, 5285 Port Royal Road, Springfield, Virginia 22161, 800-553-6847.
- (16) Method QuikChem 10-204-00-1-X may be found in "Digestion and distillation of total cyanide in drinking and wastewaters using MICRO DIST and determination of cyanide by flow injection analysis", Rev 2.1, November 30, 2000, available from Lachat Industries, 6645 West Mill Road, Milwaukee, Wisconsin 53218, 414-358-4200.

These methods are also available for copying at the Indiana Department of Environmental Management, Office of Water Quality, 100 North Senate Avenue, Room N1255, Indianapolis, Indiana 46204.

(Water Pollution Control Board; [327 IAC 8-2-4.2](#); filed Dec 28, 1990, 5:10 p.m.: 14 IR 1008; errata filed Aug 6, 1991, 3:45 p.m.: 14 IR 2258; filed Aug 24, 1994, 8:15 a.m.: 18 IR 29; errata filed Oct 11, 1994, 2:45 p.m.: 18 IR 531; filed Aug 25, 1997, 8:00 a.m.: 21 IR 40; filed Jul 23, 2001, 1:02 p.m.: 24 IR 3951; filed Jun 13, 2005, 2:30 p.m.: 28 IR 3196; errata filed Jul 6, 2005, 3:15 p.m.: 28 IR 3582; errata filed Aug 22, 2005, 2:55 p.m.: 29 IR 30)

**[327 IAC 8-2-5.2](#) Analytical methods for organic chemical testing other than volatile organic compounds and total trihalomethanes****Authority:** [IC 13-13-5](#); [IC 13-14-8-7](#); [IC 13-14-9](#); [IC 13-18-3](#); [IC 13-18-16](#)**Affected:** [IC 13-18](#)

Sec. 5.2. (a) Analysis for the contaminants listed in section 5(a) of this rule shall be conducted using the following EPA methods or their equivalents as approved by EPA established as follows **or with the alternative methods listed in Appendix A to Subpart C of 40 CFR 141:**

- (1) Dioxin, as described in Method 1613\*.
- (2) 2,4-D<sup>3</sup> (as acid, salts, and esters), as described in Method 515.2, Rev 1.1\*, Method 555, Rev 1.0\*, Method 515.1, Rev 4.0\*, Method 515.3\*, or Method D 5317-93\*.
- (3) 2,4,5-TP<sup>3</sup> (silvex), as described in Method 515.2, Rev 1.1\*, Method 555, Rev 1.0\*, Method 515.1, Rev 4.0\*, Method 515.3\*, or Method D 5317-93\*.
- (4) Alachlor<sup>1</sup>, as described in Method 505, Rev 2.1\*, Method 507, Rev 2.1\*, Method 525.2, Rev 2.0\*, Method 508.1, Rev 2.0\*, or Method 551.1, Rev 1.0\*.
- (5) Atrazine<sup>1</sup>, as described in Method 505, Rev 2.1\*, Method 507, Rev 2.1\*, Method 525.2, Rev 2.0\*, Method 508.1, Rev 2.0\*, or Method 551.1, Rev 1.0\*.
- (6) Benzo(a)pyrene, as described in Method 525.2, Rev 2.0\*, Method 550\*, or Method 550.1\*.
- (7) Carbofuran, as described in Method 531.1, Rev 3.1\*, or Method 6610\*.
- (8) Chlordane, as described in Method 505, Rev 2.1\*, Method 508, Rev 3.1\*, Method 525.2, Rev 2.0\*, or Method 508.1, Rev 2.0\*.
- (9) Dalapon, as described in Method 552.1, Rev 1.0\*, Method 515.1, Rev 4.0\*, Method 552.2, Rev 1.0\*, or Method 515.3, Rev 1.0\*.
- (10) Di(2-ethylhexyl)adipate, as described in Method 506, Rev 1.1\* or Method 525.2, Rev 2.0\*.
- (11) Di(2-ethylhexyl)phthalate, as described in Method 506, Rev 1.1\* or Method 525.2, Rev 2.0\*.
- (12) Dibromochloropropane (DBCP), as described in Method 504.1, Rev 1.1\* or Method 551.1, Rev 1.0\*.
- (13) Dinoseb<sup>3</sup>, as described in Method 515.2, Rev 1.1\*, Method 555, Rev 1.0\*, Method 515.1, Rev 4.0\*, or Method 515.3, Rev 1.0\*.
- (14) Diquat, as described in Method 549.2, Rev 1.0\*.
- (15) Endothall, as described in Method 548.1, Rev 1.0\*.
- (16) Endrin, as described in Method 505, Rev 2.1\*, Method 508, Rev 3.1\*, Method 525.2, Rev 2.0\*, Method 508.1, Rev 2.0\*, or Method 551.1, Rev 1.0\*.
- (17) Ethylene dibromide (EDB), as described in Method 504.1, Rev 1.1\* or Method 551.1, Rev 1.0\*.
- (18) Glyphosate, as described in Method 547\* or Method 6651\*.
- (19) Heptachlor, as described in Method 505, Rev 2.1\*, Method 508, Rev 3.1\*, Method 525.2, Rev 2.0\*, Method 508.1, Rev 2.0\*, or Method 551.1, Rev 1.0\*.
- (20) Heptachlor epoxide, as described in Method 505, Rev 2.1\*, Method 508, Rev 3.1\*, Method 525.2, Rev 2.0\*, Method 508.1, Rev 2.0\*, or Method 551.1, Rev 1.0\*.
- (21) Hexachlorobenzene, as described in Method 505, Rev 2.1\*, Method 508, Rev 3.1\*, Method 525.2, Rev 2.0\*, Method 508.1, Rev 2.0\*, or Method 551.1, Rev 1.0\*.
- (22) Hexachlorocyclopentadiene, as described in Method 505, Rev 2.1\*, Method 508, Rev 3.1\*, Method 525.2, Rev 2.0\*, Method 508.1, Rev 2.0\*, or Method 551.1, Rev 1.0\*.
- (23) Lindane, as described in Method 505, Rev 2.1\*, Method 508, Rev 3.1\*, Method 525.2, Rev 2.0\*, Method 508.1, Rev 2.0\*, or Method 551.1, Rev 1.0\*.
- (24) Methoxychlor, as described in Method 505, Rev 2.1\*, Method 508, Rev 3.1\*, Method 525.2, Rev 2.0\*, Method 508.1, Rev 2.0\*, or Method 551.1, Rev 1.0\*.
- (25) Oxymyl, as described in Method 531.1, Rev 3.1\* or Method 6610\*.
- (26) PCBs<sup>1</sup>:
  - (A) as decachlorobiphenyl, as described in Method 508A, Rev 1.0\*; or
  - (B) as arochlors, as described in Method 505, Rev 2.1\*, Method 508, Rev 3.1\*, Method 525.2, Rev 2.0\*, or Method 508.1, Rev 2.0\*.
- (27) Pentachlorophenol, as described in Method 515.2, Rev 1.1\*, Method 525.2, Rev 2.0\*, Method 555, Rev 1.0\*, Method 515.1, Rev 4.0\*, Method 515.3, Rev 1.0\*, or Method D 5317-93\*.
- (28) Picloram<sup>3</sup>, as described in Method 515.2, Rev 1.1\*, Method 555, Rev 1.0\*, Method 515.1, Rev 4.0\*, Method 515.3, Rev 1.0\*, or Method D 5317-93\*.
- (29) Simazine<sup>1</sup>, as described in Method 505, Rev 2.1\*, Method 507, Rev 2.1\*, Method 525.2, Rev 2.0\*, Method 508.1, Rev 2.0\*, or Method 551.1, Rev 1.0\*.

(30) Toxaphene, as described in Method 505, Rev 2.1\*, Method 508, Rev 3.1\*, Method 525.2, Rev 2.0\*, or Method 508.1, Rev 2.0\*.

<sup>1</sup>Substitution of the detector specified in Method 505, Rev 2.1, Method 507, Rev 2.1, Method 508, Rev 3.1, or Method 508.1, Rev 3.0 for the purpose of achieving lower detection limits is allowed as follows. Either an electron capture or nitrogen phosphorus detector may be used provided all regulatory requirements and quality control criteria are met.

<sup>2</sup>PCBs are qualitatively identified as Arochlors and measured for compliance purposes as decachlorobiphenyl. Users of Method 505, Rev 2.1 may have more difficulty in achieving the required detection limits than users of Method 508.1, Rev 2.0, Method 525.2, Rev 2.0 or Method 508, Rev 3.1.

<sup>3</sup>Accurate determination of the chlorinated esters requires hydrolysis of the sample as described in Method 515.1, Method 515.2, Rev 1.1, Method 515.3, Method 555, and Method D 5317-93.

(b) Analysis for PCBs shall be conducted as follows using the methods in subsection (a):

(1) Each system that monitors for PCBs shall analyze each sample using either Method 505, Rev 2.1\*, Method 508, Rev 3.1\*, Method 508.1, Rev 2.0\*, or Method 525.2, Rev 2.0\*. Users of Method 505, Rev 2.1 may have more difficulty in achieving the required Arochlor detection limits than users of Method 508.1, Rev 2.0, Method 525.2, Rev 2.0 or Method 508, Rev 3.1.

(2) If PCBs (as one (1) of seven (7) arochlors) are detected, as designated as follows, in any sample analyzed using Method 505, Rev 2.1\* or Method 508, Rev 3.1\*, the system shall reanalyze the sample using Method 508A\* to quantitate PCBs (as decachlorobiphenyl):

Arochlor	Detection Limit (mg/l)
1016	0.00008
1221	0.02
1232	0.0005
1242	0.0003
1248	0.0001
1254	0.0001
1260	0.0002

(3) Compliance with the PCB MCL shall be determined based upon the quantitative results of analyses using Method 508A\*.

(c) Analysis under this section shall only be conducted by laboratories that have received certification by EPA or the commissioner and have met the following conditions:

(1) Successfully analyze PE samples provided by the EPA, the commissioner, or by a third party with the approval of the EPA or the commissioner, at least once per year by each method for which the laboratory desires certification.

(2) For each contaminant that has been included in the PE sample achieve quantitative results on the analyses that are within the following acceptance limits:

Contaminant	Acceptance Limits (Percent)
DBCP	±40
EDB	±40
Alachlor	±45
Atrazine	±45
Benzo(a)pyrene	2 standard deviations
Carbofuran	±45
Chlordane	±45
Dalapon	2 standard deviations
Di(2-ethylhexyl)adipate	2 standard deviations
Di(2-ethylhexyl)phthalate	2 standard deviations
Dinoseb	2 standard deviations
Diquat	2 standard deviations
Endothall	2 standard deviations
Endrin	±30
Glyphosate	2 standard deviations
Heptachlor	±45
Heptachlor epoxide	±45
Hexachlorobenzene	2 standard deviations

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Hexachlorocyclopentadiene	2 standard deviations
Lindane	±45
Methoxychlor	±45
Oxamyl	2 standard deviations
PCBs (as decachlorobiphenyl)	0-200
Picloram	2 standard deviations
Simazine	2 standard deviations
Toxaphene	±45
Pentachlorophenol	±50
2,3,7,8-TCDD (dioxin)	2 standard deviations
2,4-D	±50
2,4,5-TP (silvex)	±50

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\*The methods referenced in this section may be obtained as follows:

(1) Method 508A, Rev 1.0 and Method 515.1, Rev 4.0 may be found in "Methods for the Determination of Organic Compounds in Drinking Water", EPA-600/4-88-039, December 1988, revised July 1991, available from NTIS, PB91-231480, U.S. Department of Commerce, 5285 Port Royal Road, Springfield, Virginia 22161, (800) 553-6847.

(2) Methods 547, 550, and 550.1 may be found in "Methods for the Determination of Organic Compounds in Drinking Water—Supplement I", EPA-600-4-90-020, July 1990, available from NTIS, PB91-146027, U.S. Department of Commerce, 5285 Port Royal Road, Springfield, Virginia 22161, (800) 553-6847.

(3) Methods 548.1, Rev 1.0, 552.1, Rev 1.0, and 555, Rev 1.0 may be found in "Methods for the Determination of Organic Compounds in Drinking Water—Supplement II", EPA-600/R-92-129, August 1992, available from NTIS, PB92-207703, U.S. Department of Commerce, 5285 Port Royal Road, Springfield, Virginia 22161, (800) 553-6847.

(4) Methods 504.1, Rev 1.1, 505, Rev 2.1, 506, Rev 1.1, 507, Rev 2.1, 508, Rev 3.1, 508.1, Rev 2.0, 515.2, Rev 1.1, 525.2, Rev 2.0, 531.1, Rev 3.1, 551.1, Rev 1.0, and 552.2, Rev 1.0 may be found in "Methods for the Determination of Organic Compounds in Drinking Water - Supplement III", EPA-600/R-95-131, August 1995, available from NTIS, PB95-261616, U.S. Department of Commerce, 5285 Port Royal Road, Springfield, Virginia 22161, (800) 553-6847.

(5) Method 1613 may be found in "Tetra-through Octa-Chlorinated Dioxins and Furans by Isotope Dilution HRGC/HRMS", EPA 821-B-94-005, October 1994, available from NTIS, PB95-104774, U.S. Department of Commerce, 5285 Port Royal Road, Springfield, Virginia 22161, (800) 553-6847.

(6) Method 6651 may be found in "18th Edition of Standard Methods for the Examination of Water and Wastewater", "19th Edition of Standard Methods for the Examination of Water and Wastewater", and "20th Edition of Standard Methods for the Examination of Water and Wastewater", 1992, 1995, and 1998, American Public Health Association, available from the American Public Health Association, 1015 Fifteenth Street NW, Washington, D.C. 20005. Any of these three (3) editions may be used.

(7) Method 6610 may be found in "Supplement to the 18th Edition of Standard Methods for Water and Wastewater", "19th Edition of Standard Methods for the Examination of Water and Wastewater", or "20th Edition of Standard Methods for the Examination of Water and Wastewater", 1994, 1995, and 1998, American Public Health Association, available from the National Public Health Association, 1015 Fifteenth Street NW, Washington, D.C. 20005. Any of these three (3) publications may be used.

(8) Other required analytical test procedures germane to the conduct of these analyses are contained in "Technical Notes of Drinking Water Methods", EPA/600/R-94-173, October 1994, available from NTIS, PB95-104766, U.S. Department of Commerce, 5285 Port Royal Road, Springfield, Virginia 22161, (800) 553-6847.

(9) EPA Methods 515.3, Rev 1.0 and 549.2, Rev 1.0 may be found in "Methods for the Determination of Organic and Inorganic Compounds in Drinking Water, Volume 1", 2000, EPA 815-R-00-014, available from U.S. EPA/NSCEP, Post Office Box 42419, Cincinnati, Ohio 42419, (800) 490-9198.

(10) ASTM Method D 5317-93 may be found in the "Annual Book of ASTM Standards", 1999, Vol. 11.02, available from the American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, Pennsylvania 19428. Method D 5317-93 may also be found in any other edition of the "Annual Book of ASTM Standards" published from 1993 until the effective date of this rule.

(11) Method 531.2, "Measurement of N-methylcarbamoyloximes and N-methylcarbamates in Water by Direct Aqueous Inactivation HPLC with Postcolumn Derivatization", Rev 1.0, September 2001, EPA 815/B/01/002 can be assessed and downloaded directly on-line at [www.epa.gov/safewater/methods/sorcalt.html](http://www.epa.gov/safewater/methods/sorcalt.html).

These methods are available for copying at the Indiana Department of Environmental Management, Office of Water Quality, 100 North Senate Avenue, Room N1255, Indianapolis, Indiana 46204.

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(Water Pollution Control Board; [327 IAC 8-2-5.2](#); filed Dec 28, 1990, 5:10 p.m.: 14 IR 1011; errata filed Aug 6, 1991, 3:45 p.m.: 14 IR 2258; filed Aug 24, 1994, 8:15 a.m.: 18 IR 35; errata filed Oct 11, 1994, 2:45 p.m.: 18 IR 531; filed Aug 25, 1997, 8:00 a.m.: 21 IR 46; errata filed Dec 10, 1997, 3:45 p.m.: 21 IR 1347; filed Jul 23, 2001, 1:02 p.m.: 24 IR 3956; filed Jun 13, 2005, 2:30 p.m.: 28 IR 3200; errata filed Jul 6, 2005, 3:15 p.m.: 28 IR 3582)

SECTION 3. [327 IAC 8-2-5.6](#) IS AMENDED TO READ AS FOLLOWS:

**[327 IAC 8-2-5.6](#) Analytical methods for volatile organic compounds**

**Authority:** [IC 13-13-5](#); [IC 13-14-8-7](#); [IC 13-14-9](#); [IC 13-18-3](#); [IC 13-18-16](#)

**Affected:** [IC 13-18](#)

Sec. 5.6. (a) Analysis for the contaminants listed in section 5.5 of this rule shall be conducted using the following U.S. EPA methods or their equivalent as approved by EPA **or with the alternative methods listed in Appendix A to Subpart C of 40 CFR 141:**

- (1) Benzene, as described in Method 502.2, Rev 2.1\* or Method 524.2, Rev 4.1\*.
- (2) Carbon tetrachloride, as described in Method 502.2, Rev 2.1\*, Method 524.2, Rev 4.1\*, or Method 551.1, Rev 1.0\*.
- (3) Chlorobenzene, as described in Method 502.2, Rev 2.1\* or Method 524.2, Rev 4.1\*.
- (4) 1,2-dichlorobenzene, as described in Method 502.2, Rev 2.1\* or Method 524.2, Rev 4.1\*.
- (5) 1,4-dichlorobenzene, as described in Method 502.2, Rev 2.1\* or Method 524.2, Rev 4.1\*.
- (6) 1,2-dichloroethane, as described in Method 502.2, Rev 2.1\* or Method 524.2, Rev 4.1\*.
- (7) cis-dichloroethylene, as described in Method 502.2, Rev 2.1\* or Method 524.2, Rev 4.1\*.
- (8) trans-dichloroethylene, as described in Method 502.2, Rev 2.1\* or Method 524.2, Rev 4.1\*.
- (9) Dichloromethane, as described in Method 502.2, Rev 2.1\* or Method 524.2, Rev 4.1\*.
- (10) 1,2-dichloropropane, as described in Method 502.2, Rev 2.1\* or Method 524.2, Rev 4.1\*.
- (11) Ethylbenzene, as described in Method 502.2, Rev 2.1\* or Method 524.2, Rev 4.1\*.
- (12) Styrene, as described in Method 502.2, Rev 2.1\* or Method 524.2, Rev 4.1\*.
- (13) Tetrachloroethylene, as described in Method 502.2, Rev 2.1\*, Method 524.2, Rev 4.1\*, or Method 551.1, Rev 1.0\*.
- (14) 1,1,1-trichloroethane, as described in Method 502.2, Rev 2.1\*, Method 524.2, Rev 4.1\*, or Method 551.1, Rev 1.0\*.
- (15) Trichloroethylene, as described in Method 502.2, Rev 2.1\*, Method 524.2, Rev 4.1\*, or Method 551.1, Rev 1.0\*.
- (16) Toluene, as described in Method 502.2, Rev 2.1\* or Method 524.2, Rev 4.1\*.
- (17) 1,2,4-trichlorobenzene, as described in Method 502.2, Rev 2.1\* or Method 524.2, Rev 4.1\*.
- (18) 1,1-dichloroethylene, as described in Method 502.2, Rev 2.1\* or Method 524.2, Rev 4.1\*.
- (19) 1,1,2-trichloroethane, as described in Method 502.2, Rev 2.1\*, Method 524.2, Rev 4.1\*, or Method 551.1, Rev 1.0\*.
- (20) Vinyl chloride, as described in Method 502.2, Rev 2.1\* or Method 524.2, Rev 4.1\*.
- (21) Xylenes (total), as described in Method 502.2, Rev 2.1\* or Method 524.2, Rev 4.1\*.

(b) Analysis under this section shall only be conducted by laboratories that are certified by the commissioner or EPA under 40 CFR 141.28\*.

(c) The following procedure shall be followed to composite samples prior to analysis:

- (1) Compositing of samples prior to gas chromatography (GC) analysis shall be as follows:
  - (A) Add five (5) milliliters or equal larger amounts of each sample (up to five (5) samples are allowed) to a twenty-five (25) milliliter glass syringe. Special precautions must be made to maintain zero (0) headspace in the syringe.
  - (B) The samples must be cooled at four (4) degrees Celsius during this step to minimize volatilization losses.
  - (C) Mix well and draw out a five (5) milliliter aliquot for analysis.
  - (D) Follow sample introduction, purging, and desorption steps described in the method.
  - (E) If less than five (5) samples are used for compositing, a proportionately smaller syringe may be used.
- (2) Compositing of samples prior to gas chromatography/mass spectrometry (GC/MS) analysis shall be as follows:
  - (A) Inject five (5) milliliters or equal larger amounts of each aqueous sample (up to five (5) samples are

allowed) into a twenty-five (25) milliliter purging device using the sample introduction technique described in the method.

(B) The total volume of the sample in the purging device must be twenty-five (25) milliliters.

(C) Purge and desorb as described in the method.

\*Methods referenced in this section may be obtained as follows:

(1) Method 551 may be found in "Methods for the Determination of Organic Compounds in Drinking Water—Supplement I", July 1990, EPA-600-4-90-020, available from NTIS, PB91-146027, U.S. Department of Commerce, 5285 Port Royal Road, Springfield, Virginia 22161, (800) 553-6847.

(2) Methods 502.2, Rev 2.1, 524.2, Rev 4.1, and 551.1, Rev 1.0 may be found in "Methods for the Determination of Organic Compounds in Drinking Water - Supplement III", EPA/600/R-95-131, August 1995, available from NTIS, PB95-261616, U.S. Department of Commerce, 5285 Port Royal Road, Springfield, Virginia 22161, (800) 553-6847.

(3) 40 CFR 141.28 may be obtained from the Superintendent of Documents, Government Printing Office, Washington, D.C. 20402.

These methods are available for copying at the Indiana Department of Environmental Management, Office of Water Quality, 100 North Senate Avenue, Room N1255, Indianapolis, Indiana 46204.

*(Water Pollution Control Board; [327 IAC 8-2-5.6](#); filed Dec 28, 1990, 5:10 p.m.: 14 IR 1015; errata filed Aug 6, 1991, 3:45 p.m.: 14 IR 2258; filed Aug 24, 1994, 8:15 a.m.: 18 IR 44; errata filed Oct 11, 1994, 2:45 p.m.: 18 IR 531; filed Oct 24, 1997, 4:30 p.m.: 21 IR 939; filed Jul 23, 2001, 1:02 p.m.: 24 IR 3963; errata filed Feb 6, 2006, 11:15 a.m.: 29 IR 1937)*

SECTION 4. [327 IAC 8-2-8.4](#) IS AMENDED TO READ AS FOLLOWS:

#### **[327 IAC 8-2-8.4](#) Analytical methods for microbiological contaminants**

**Authority:** [IC 13-13-5](#); [IC 13-14-8-7](#); [IC 13-14-9](#); [IC 13-18-3](#); [IC 13-18-16](#)

**Affected:** [IC 13-11-2](#); [IC 13-14-8](#); [IC 13-18-1](#); [IC 13-18-2](#)

Sec. 8.4. (a) A public water system shall analyze for microbiological contaminants as follows:

(1) The standard sample volume required for total coliform analysis, regardless of analytical method used, is one hundred (100) milliliters.

(2) Public water systems need only determine the presence or absence of total coliforms, and a determination of total coliform density is not required.

(3) Public water systems must conduct total coliform analyses in accordance with one (1) of the following analytical methods **or with the alternative methods listed in Appendix A to Subpart C of 40 CFR 141:**

(A) Total coliform fermentation technique<sup>1, 2, 3</sup> as set forth in Method 9221A\* and Method 9221B\*.

(B) Total coliform membrane filter technique<sup>4</sup> as set forth in Method 9222A\*, Method 9222B\*, and Method 9222C\*.

(C) Presence-absence (P-A) coliform test<sup>3, 5</sup> as set forth in Method 9221D\*.

(D) ONPG-MUG test<sup>6</sup> as set forth in Method 9223\*.

(E) Colisure test<sup>7</sup>.

(F) E\*Colite<sup>®</sup> test\*.

(G) m-ColiBlue24<sup>®</sup> test\*.

(4) Public water systems must conduct fecal coliform analysis in accordance with the procedure in this subdivision. When the MTF technique or presence-absence (P-A) coliform test is used to test for total coliforms, shake the lactose-positive presumptive tube or P-A bottle vigorously and transfer the growth with a sterile three (3) millimeter loop or sterile applicator stick into brilliant green lactose bile broth and EC medium to determine the presence of total and fecal coliforms, respectively. For EPA-approved analytical methods which use a membrane filter, transfer the total coliform-positive culture by one (1) of the following methods:

(A) Remove the membrane containing the total coliform colonies from the substrate with a sterile forceps and carefully curl and insert the membrane into a tube of EC medium. (The laboratory may first remove a small portion of selected colonies for verification.)

(B) Alternately, the laboratory may swab the entire membrane filter surface with a sterile cotton swab and transfer the inoculum to EC medium (do not leave the cotton swab in the EC medium), or inoculate individual total coliform-positive colonies into EC medium.

Gently shake the inoculated EC tubes to ensure adequate mixing and incubate in a water bath at forty-four and one-half (44.5) degrees Celsius, plus or minus two-tenths (0.2) degrees Celsius, for twenty-four (24)

hours, plus or minus two (2) hours. Gas production of any amount in the inner fermentation tube of the EC medium indicates a positive fecal coliform test. The preparation of EC medium is described in Method 9221E, paragraph 1(a)\*. Public water systems need only determine the presence or absence of fecal coliforms; a determination of fecal coliform density is not required.

(5) Public water systems must conduct analysis of *Escherichia coli* in accordance with one (1) of the following analytical methods **or with the alternative methods listed in Appendix A to Subpart C of 40 CFR 141:**

(A) EC medium supplemented with fifty (50) micrograms per milliliter of 4-methylumbelliferyl-beta-D-glucuronide (MUG) (final concentration). EC medium is described in Method 9221E, paragraph 1(a)\*. MUG may be added to EC medium before autoclaving. EC medium supplemented with fifty (50) micrograms per milliliter of MUG is commercially available. At least ten (10) milliliters of EC medium supplemented with MUG must be used. The inner inverted fermentation tube may be omitted. The procedure for transferring a total coliform-positive culture to EC medium supplemented with MUG shall be as specified in subdivision (4) for transferring a total coliform-positive culture to EC medium. Observe fluorescence with an ultraviolet light three hundred sixty-six (366) nanometers (preferably with a six (6) watt lamp) in the dark after incubating tube at forty-four and one-half (44.5) degrees Celsius, plus or minus two-tenths (0.2) degrees Celsius for twenty-four (24) hours, plus or minus two (2) hours.

(B) Nutrient agar supplemented with one hundred (100) micrograms per milliliter of MUG (final concentration). Nutrient agar is described in Method 9221E\*. This test is used to determine if a total coliform-positive sample, as determined by the membrane filter technique or any other method in which a membrane filter is used contains *E. coli*. Transfer the membrane filter containing a total coliform ~~colony(ies)~~ **colony or colonies** to nutrient agar supplemented with one hundred (100) micrograms per milliliter (final concentration) of MUG. After incubating the agar plate at thirty-five (35) degrees Celsius for four (4) hours, observe the ~~colony(ies)~~ **colony or colonies** under ultraviolet light three hundred sixty-six (366) nanometers (preferably with a six (6) watt lamp) in the dark for fluorescence. If fluorescence is visible, *E. coli* are present.

(C) Minimal medium ONPG-MUG (MMO-MUG) test as described in the article "National Field Evaluation of a Defined Substrate Methods for the Simultaneous Detection of Total Coliforms and *Escherichia coli* from Drinking Water: Comparison with Presence-Absence Techniques\*". If the MMO-MUG test is total coliform-positive after a twenty-four (24) hour incubation, test the medium for fluorescence with a three hundred sixty-six (366) nanometer ultraviolet light (preferably with a six (6) watt lamp) in the dark. If fluorescence is observed, the sample is *E. coli*-positive. If fluorescence is questionable (cannot be definitively read) after twenty-four (24) hours incubation, incubate the culture for an additional four (4) hours, but not to exceed twenty-eight (28) hours total, and again test the medium for fluorescence. The MMO-MUG test with hepes buffer in lieu of phosphate buffer is the only approved formulation for the detection of *E. coli*.

(D) The Colisure test\*.

(E) The Membrane Filter Method with MI agar\*.

(F) E\*Colite® test\*.

(G) m-ColiBlue24® test\*.

(6) As an option to subdivision (5)(C), a system with a total coliform-positive, MUG-negative, MMO-MUG test may further analyze the culture for the presence of *E. coli* by transferring a one-tenth (0.1) milliliter, twenty-eight (28) hour MMO-MUG culture to EC medium plus MUG with a pipet. The formulation and incubation conditions of EC medium plus MUG and observation of the results are described in subdivision (5)(A).

(b) Response to a violation shall be as follows:

(1) A public water system which has exceeded the MCL for total coliforms in section 7 of this rule must report the violation to the commissioner no later than the end of the next business day after it learns of the violation and notify the public in accordance with [327 IAC 8-2.1-7](#) through [327 IAC 8-2.1-16](#).

(2) A public water system which has failed to comply with a coliform monitoring requirement, including the sanitary survey requirement, must report the monitoring violation to the commissioner within ten (10) days after the system discovers the violation, and notify the public in accordance with [327 IAC 8-2.1-7](#) through [327 IAC 8-2.1-16](#).

(c) The time from sample collection to initiation of analysis cannot exceed thirty (30) hours. Systems are encouraged but not required to hold samples below ten (10) degrees Celsius during transit.

(d) The agency strongly recommends that laboratories evaluate the false-positive and negative rates for the method or methods they use for monitoring total coliforms. The agency also encourages laboratories to establish false-positive and negative rates within their own laboratory and sample matrix (drinking water or source water or both) with the intent that if the method they choose has an unacceptable false-positive or negative rate, another

method can be used. The agency suggests that laboratories perform these studies on a minimum of five percent (5%) of all total coliform-positive samples, except for those methods where verification or confirmation or both is already required, for example, the M-Endo and LES Endo Membrane Filter Tests, Standard Total Coliform Fermentation Technique, and Presence-Absence Coliform Test. Methods for establishing false-positive and negative-rates may be based on lactose fermentation, the rapid test for  $\beta$ -galactosidase and cytochrome oxidase, multi-test identification systems, or equivalent confirmation tests. False-positive and false-negative information is often available in published studies or from the manufacturer, or both.

<sup>1</sup>Lactose broth, as commercially available, may be used in lieu of lauryl tryptose broth, if the system conducts at least twenty-five (25) parallel tests between this medium and lauryl tryptose broth using the water normally tested, and this comparison demonstrates that the false-positive rate and false-negative rate for total coliform, using lactose broth, is less than ten percent (10%).

<sup>2</sup>If inverted tubes are used to detect gas production, the media should cover these tubes at least one-half (1/2) to two-thirds (2/3) after the sample is added.

<sup>3</sup>No requirement exists to run the completed phase on ten percent (10%) of all total coliform-positive confirmed tubes.

<sup>4</sup>MI agar may also be used\*.

<sup>5</sup>Six-times formulation strength may be used if the medium is filter-sterilized rather than autoclaved.

<sup>6</sup>The OPNG-MUG test is also known as the Autoanalysis Colilert System.

<sup>7</sup>The Colisure Test may be read after an incubation time of twenty-four (24) hours.

\*The methods referenced in this section may be obtained as follows:

(1) Methods 9221A, 9221B, 9222A, 9222B, 9222C, 9221D, 9223, and 9221E may be found in "Standard Methods for the Examination of Water and Wastewater", 1992, American Public Health Association, et al., 18th edition, or "Standard Methods for the Examination of Water and Wastewater", 1995, American Public Health Association, et al., 19th edition, available from the American Public Health Association, et al., 1015 Fifteenth Street N.W., Washington, D.C. 20005.

(2) A description of the Colisure test may be obtained from IDEXX Laboratories, Inc., One IDEXX Drive, Westbrook, Maine 04092.

(3) The minimal medium ONPG-MUG test may be found in "National Field Evaluation of a Defined Substrate Method for the Simultaneous Detection of Total Coliforms and Escherichia coli from Drinking Water: Comparison with Presence-Absence Techniques", (Edberg, et al.), Applied and Environmental Microbiology, Volume 55, pages 1003–1008, April 1989.

(4) Preparation and use of MI agar is set forth in the article, "New Medium for the Simultaneous Detection of Total Coliforms and Escherichia coli in Water" by Brenner, K.P., et al., 1993, Applied and Environmental Microbiology, 59:3534-3544, and errata published in Applied and Environmental Microbiology, 59:4378. Also available from the Office of Water Resource Center (RC-4100), 401 M. Street S.W., Washington, D.C. 20460, EPA/600/J-99/225.

(5) A description of the E\*Colite<sup>®</sup> test, "Presence/Absence for Coliforms and E. coli in Water", December 24, 1997, is available from Charm Sciences, Inc., 36 Franklin Street, Malden, Massachusetts 02148-4120.

(6) A description of the m-ColiBlue24<sup>®</sup> test, August 17, 1999, is available from the Hach Company, 100 Dayton Avenue, Ames, Iowa 50010.

These methods are available for copying at the Indiana Department of Environmental Management, Office of Water Quality, 100 North Senate Avenue, Room N1255, Indianapolis, Indiana 46204.

(Water Pollution Control Board; [327 IAC 8-2-8.4](#); filed Dec 28, 1990, 5:10 p.m.: 14 IR 1023; errata filed Jan 9, 1991, 2:30 p.m.: 14 IR 1070; filed Apr 12, 1993, 11:00 a.m.: 16 IR 2158; filed Aug 25, 1997, 8:00 a.m.: 21 IR 51; errata filed Dec 10, 1997, 3:45 p.m.: 21 IR 1348; filed Jul 23, 2001, 1:02 p.m.: 24 IR 3968; errata filed Jul 25, 2001, 3:25 p.m.: 24 IR 3991; filed Nov 20, 2001, 10:20 a.m.: 25 IR 1092; errata filed Feb 22, 2002, 2:01 p.m.: 25 IR 2254; errata filed Feb 6, 2006, 11:15 a.m.: 29 IR 1937)

SECTION 5. [327 IAC 8-2-8.7](#) IS AMENDED TO READ AS FOLLOWS:

**[327 IAC 8-2-8.7](#) Analytical and monitoring requirements; fecal coliform, total coliform, turbidity, disinfection for public water systems**

**Authority:** [IC 13-13-5](#); [IC 13-14-8-7](#); [IC 13-14-9](#); [IC 13-18-3](#); [IC 13-18-16](#)

**Affected:** [IC 13-11-2](#); [IC 13-14-8](#); [IC 13-18-1](#); [IC 13-18-2](#)

Sec. 8.7. Only the analytical methods and procedures specified in this section, or otherwise approved by EPA,

may be used to demonstrate compliance **by public water systems** with sections 8.5 and 8.6 of this rule. Measurements for pH, turbidity, temperature, and residual disinfectant concentrations must be conducted using methods specified in this rule. **Analysis of pH and temperature must be conducted in accordance with one (1) of the methods listed at 40 CFR 141.23(k)(1). Analysis of total coliforms, fecal coliforms, heterotrophic bacteria, and turbidity must be conducted in accordance with one (1) of the following analytical methods or one (1) of the alternate methods listed in Appendix A to Subpart C of 40 CFR 141, and by using analytical test procedures contained in Technical Notes on Drinking Water Methods, EPA-600/R-94-173, October 1994. This document is available from the National Service Center for Environmental Publications (NSCEP), P.O. Box 42419, Cincinnati, OH 45242-0419 or <http://www.epa.gov/nscep/>.** Measurements for total coliforms, fecal coliforms, and HPC must be conducted by a laboratory certified by the commissioner or EPA under 40 CFR 141.28\*. Until laboratory certification criteria are developed for the analysis of fecal coliforms and HPC, any laboratory certified for total coliforms analysis by the commissioner or EPA is deemed certified for fecal coliforms and HPC analysis. The following procedures shall be conducted in accordance with the publications listed as follows:

(1) Total coliform<sup>1</sup> as set forth in the following:

- (A) Total coliform fermentation technique<sup>2,3,4</sup>, Method 9221A\*, and B\*.
- (B) Total coliform membrane filter technique<sup>7,6</sup>, Method 9222A\*, B\*, and C\*.
- (C) ONPG-MUG test membrane<sup>5</sup>, Method 9223\*.
- (D) Presence-Absence (P-A) coliform test<sup>4,7</sup>, Method 9221D\*.
- (E) Colisure test<sup>8\*</sup>.
- (F) E\*Colite test\*.
- (G) m-ColiBlue24 test\*.
- (H) ReadyCult Coliforms 100 Presence/Absence test\*.
- (I) Membrane Filter Technique using Chromocult Coliform Agar\*.
- (J) Colitag test\*.

(2) Fecal coliforms<sup>1</sup> as set forth in:

- (A) fecal coliform procedure<sup>9</sup>, Method 9221E\*; or
- (B) fecal coliform filter procedure, Method 9222D.

(3) Heterotrophic bacteria<sup>1</sup>, Method 9215B\*, pour plate method.

(4) Turbidity as set forth in:

- (A) nephelometric method, Method 2130B\* or Method 180.1\*; or
- (B) Great Lakes Instruments method, Method 2\*.

(5) Residual disinfectant concentrations for free chlorine and combined chlorine (chloramines) as set forth in the following methods **or with the alternative methods listed in Appendix A to Subpart C of 40 CFR 141. If approved by the commissioner, residual disinfectant concentrations for free chlorine and combined chlorine also may be measured using DBD colorimetric test kits. In addition, the commissioner may approve the use of the ITS free chlorine test strip for the determination of free chlorine. Use of the test strips is described in Method D99-003, "Free Chlorine Species (HOCl<sup>+</sup> and OCl<sup>-</sup>) by Test Strip", Revision 3.0, November 21, 2003, available from Industrial Test Systems, Inc., 1875 Langston St., Rock Hill, SC 29730. Free and total chlorine residuals may be measured continuously by adapting a specific chlorine residual method for use with a continuous monitoring instrument provided the chemistry, accuracy, and precision remain the same. Instruments used for continuous monitoring must be calibrated with a grab sample measurement at least every five (5) days, or with a protocol approved by the commissioner:**

- (A) Method 4500-Cl D\*, amperometric titration method.
- (B) Method 4500-Cl F\*, DPD ferrous titrimetric method.
- (C) Method 4500-Cl G\*, DPD colorimetric method.
- (D) Method 4500-Cl H\*, syringaldazine (FACTS).
- (E) DPD colorimetric test kits, if approved by the commissioner.
- (F) Free chlorine residuals may be measured continuously by adapting a specified chlorine residual method for use with a continuous monitoring instrument, provided the chemistry, accuracy, and precision remain the same. Instruments used for continuous monitoring must be calibrated with a grab sample measurement at least every five (5) days, or with a protocol approved by the commissioner.

(6) Residual disinfectant concentrations for ozone by the indigo method, Method 4500-O<sub>3</sub> B\*.

(7) Residual disinfectant concentrations for chlorine dioxide must be measured by Method 4500-ClO<sub>2</sub> C, amperometric method, Method 4500-ClO<sub>2</sub> E\*, amperometric method, or Method 4500-ClO<sub>2</sub> D\*, DPD method.

(8) Residual disinfectant concentrations for total chlorine by the following methods:

- (A) Method 4500-Cl D\*, amperometric titration.
- (B) Method 4500-Cl E\*, amperometric titration (low level measurement).
- (C) Method 4500-Cl F\*, DPD ferrous titrimetric.

(D) Method 4500-Cl I, iodometric electrode.

(E) Method 4500-Cl G\*, DPD colorimetric.

(F) Total chlorine residuals may be measured continuously by adapting a specified chlorine residual method for use with a continuous monitoring instrument, provided the chemistry, accuracy, and precision remain the same. Instruments used for continuous monitoring must be calibrated with a grab sample measurement at least every five (5) days, or with a protocol approved by the commissioner.

<sup>1</sup>The time from sample collection to initiation of analysis may not exceed thirty (30) hours. Systems must hold samples below ten (10) degrees Celsius during transit.

<sup>2</sup>Lactose broth, as commercially available, may be used instead of lauryl tryptose broth if the system conducts at least twenty-five (25) parallel tests between this medium and lauryl tryptose broth using the water normally tested, and this comparison demonstrates that the false-positive rate and false-negative rate for total coliforms using lactose broth, is less than ten percent (10%).

<sup>3</sup>Media should cover inverted tubes at least one-half (1/2) to two-thirds (2/3) after the sample is added.

<sup>4</sup>No requirement exists to run the completed phase on ten percent (10%) of all total coliform-positive confirmed tubes.

<sup>5</sup>The ONPG-MUG test is also known as the Autoanalysis Colilert System.

<sup>6</sup>MI Agar may also be used.

<sup>7</sup>Six (6) times formulation strength may be used if the medium is filter-sterilized rather than autoclaved.

<sup>8</sup>The Colisure test may be read after an incubation time of twenty-four (24) hours.

<sup>9</sup>A-1 broth may be held up to three (3) months in a tightly closed screwcap tube at four (4) degrees Celsius.

\*The following methods are incorporated by reference:

(1) Methods 2130B, 4500-Cl D, 4500-Cl E, 4500-Cl F, 4500-Cl G, 4500-Cl H, 4500-CL-I, 4500-ClO<sub>2</sub> C, 4500-ClO<sub>2</sub> D, 4500-ClO<sub>2</sub> E, 9215B, 9221A, 9221B, 9221D, 9221E, 9222A, 9222B, 9222C, 9222D, and 9223 may be found in "18th Edition of Standard Methods for the Examination of Water and Wastewater", "19th Edition of Standard Methods for the Examination of Water and Wastewater", and "20th Edition of Standard Methods for the Examination of Water and Wastewater", 1992, 1995, and 1998 available from the American Public Health Association, 1015 Fifteenth Street, Washington, D.C. 20005. The cited methods published in any of these three (3) editions may be used.

(2) Method 4500-O<sub>2</sub> B may be found in "18th Edition of Standard Methods for the Examination of Water and Wastewater" and "19th Edition of Standard Methods for the Examination of Water and Wastewater", 1992 and 1995, available from the American Public Health Association, 1014 Fifteenth Street, Washington, D.C. 20005. Either edition may be used.

(3) A description of the Colisure Test, February 28, 1994, may be obtained from IDEXX Laboratories, Inc., One IDEXX Drive, Westbrook, Maine 04092.

(4) A description of the E\*Colite test, "Presence/Absence for Coliforms and E. coli in Water", December 21, 1997, is available from Charm Sciences, Inc., 36 Franklin Street, Malden, Massachusetts 02148-4120.

(5) A description of the m-ColiBlue24 test, August 17, 1999, is available from the Hach Company, 100 Dayton Avenue, Ames, Iowa 50010.

(6) The ReadyCult Coliforms 100 Presence/Absence Test is described in the document "ReadyCult Coliforms 100 Presence/Absence Test for Indication of Coliform Bacteria and Escherichia coli in Finished Waters", November 2000, Version 1.0, available from EM Science, an affiliate of Merck KgaA of Darmstadt, Germany, 480 South Democrat Road, Gibbstown, New Jersey 08027-0342.

(7) Membrane Filter Technique using Chromocult Coliform Agar is described in the document "Chromocult Coliform Agar Presence/Absence Membrane Filter Test Method for Detection and Identification of Coliform Bacteria and Escherichia coli in Finished Waters", November 2000, Version 1.0, available from EM Science, an affiliate of Merck KgaA of Darmstadt, Germany, 480 South Democrat Road, Gibbstown, New Jersey 08027-0342.

(8) Colitag product for the determination of presence/absence of total coliforms and E. coli is described in "Colitag Product as a Test for Detection and Identification of Coliforms and E. coli Bacteria in Drinking Water and Source Water as Required in National Primary Drinking Water Regulations", August 2001, available from CPI International, Inc., 5580 Skylane Drive, Santa Rosa, California 95403. The telephone number is (800) 878-7654.

(9) Method 180.1 may be found in "Methods for the Determination of Inorganic Substances in Environmental Samples", EPA-600/R-93-100, August 1993, available from NTIS, PB94-121811, U.S. Department of Commerce, 5285 Port Royal Road, Springfield, Virginia 22161.

(10) The Great Lakes Instrument (GLI) Method 2 may be found in "Turbidity", November 2, 1992, Great Lakes Instruments, Inc., 8855 North 55th Street, Milwaukee, Wisconsin 53223.

(11) 40 CFR 141.28 may be obtained from the Superintendent of Documents, Government Printing Office, Washington, D.C. 20402.

These methods are available for copying at the Indiana Department of Environmental Management, Office of Water Quality, 100 North Senate Avenue, Room N1255, Indianapolis, Indiana 46204.

(Water Pollution Control Board; [327 IAC 8-2-8.7](#); filed Dec 28, 1990, 5:10 p.m.: 14 IR 1025; errata filed Jan 9, 1991, 2:30 p.m.: 14 IR 1070; filed Apr 12, 1993, 11:00 a.m.: 16 IR 2161; filed Aug 25, 1997, 8:00 a.m.: 21 IR 53; errata filed Dec 10, 1997, 3:45 p.m.: 21 IR 1348; filed Jul 23, 2001, 1:02 p.m.: 24 IR 3970; filed Jun 13, 2005, 2:30 p.m.: 28 IR 3207; errata filed Jul 6, 2005, 3:15 p.m.: 28 IR 3582)

SECTION 6. [327 IAC 8-2-10.1](#) IS AMENDED TO READ AS FOLLOWS:

**[327 IAC 8-2-10.1](#) Analytical methods for radioactivity**

**Authority:** [IC 13-13-5](#); [IC 13-14-8-7](#); [IC 13-14-9](#); [IC 13-18-3](#); [IC 13-18-16](#)

**Affected:** [IC 13-18](#)

Sec. 10.1. (a) The following methods **or with the alternative methods listed in Appendix A to Subpart C of 40 CFR 141, or their equivalent determined by the U.S. EPA in accordance with 40 CFR 141.27**, shall be used to determine compliance with sections 9 through 10 of this rule, except in cases where alternative methods have been approved in accordance with section 32 of this rule:

- (1) One (1) of the following methods shall be used to test for gross alpha and beta<sup>1</sup>:
  - (A) Method 900.0\*.
  - (B) Page 1 of "Interim Radiochemical Methodology for Drinking Water\*\*".
  - (C) Method 00-01\*.
  - (D) Page 1 of "Radiochemical Analytical Procedures for Analysis of Environmental Samples\*\*".
  - (E) Method 302\*.
  - (F) Method 7110 B\*.
  - (G) Method R-1120-76\*.
- (2) One (1) of the following methods shall be used to test for gross alpha<sup>1</sup>:
  - (A) Method 00-02\*.
  - (B) Method 7110 C\*.
- (3) One (1) of the following methods shall be used to test for radium 226:
  - (A) Method 903.1\*.
  - (B) Method 903.0\*.
  - (C) Page 16 of "Interim Radiochemical Methodology for Drinking Water\*\*".
  - (D) Page 13 of "Interim Radiochemical Methodology for Drinking Water\*\*".
  - (E) Method Ra-04\*.
  - (F) Method Ra-03\*.
  - (G) Page 19 of "Radiochemical Analytical Procedures for Analysis of Environmental Samples\*\*".
  - (H) Method 7500-Ra C\*.
  - (I) Method 304\*.
  - (J) Method 305\*.
  - (K) Method 7500-Ra B\*.
  - (L) Method D 3454-97\*.
  - (M) Method D 2460-97\*.
  - (N) Method R-1141-76\*.
  - (O) Method R-1140-76\*.
  - (P) Method Ra-04\*.
  - (Q) New York Method\*.
- (4) One (1) of the following methods shall be used to test for radium 228:
  - (A) Method 904.0\*.
  - (B) Page 24 of "Interim Radiochemical Methodology for Drinking Water\*\*".
  - (C) Method Ra-05\*.
  - (D) Page 19 of "Radiochemical Analytical Procedures for Analysis of Environmental Samples\*\*".
  - (E) Method 7500-Ra D\*.
  - (F) Method R-1142-76\*.
  - (G) New York Method\*.
  - (H) New Jersey Method\*.
- (5) One (1) of the following methods shall be used to test for uranium<sup>2</sup>:
  - (A) Method 908.0\*.
  - (B) Method 908.1\*.

- (C) Method 00-07\*.
- (D) Page 33 of "Radiochemical Analytical Procedures for Analysis of Environmental Samples\*\*".
- (E) Method 7500-U B\*.
- (F) Method 7500-U C\*.
- (G) Method D 2907-97\*.
- (H) Method D 3972-97\*.
- (I) Method D 5174-97\*.
- (J) Method R-1180-76\*.
- (K) Method R-1181-76\*.
- (L) Method R-1182-76\*.
- (M) Method U-04\*.
- (N) Method U-02\*.
- (O) Method 200.8\*.
- (P) Method D 5673-03\*.
- (Q) Method 3125\*.
- (6) One (1) of the following methods shall be used to test for radioactive cesium:
  - (A) Method 901.0\*.
  - (B) Method 901.1\*.
  - (C) Page 92 of "Radiochemical Analytical Procedures for Analysis of Environmental Samples\*\*".
  - (D) Method 7500-Cs B\*.
  - (E) Method 7120\*.
  - (F) Method D 2459-72\*.
  - (G) Method D 3649-91\*.
  - (H) Method R-1111-76\*.
  - (I) Method R-1110-76\*.
  - (J) Method 4.5.2.3\*.
  - (K) Page 4 of "Interim Radiochemical Methodology for Drinking Water\*\*".
- (7) One (1) of the following methods shall be used to test for radioactive iodine:
  - (A) Method 902.0\*.
  - (B) Method 901.1\*.
  - (C) Page 6 of "Interim Radiochemical Methodology for Drinking Water\*\*".
  - (D) Page 9 of "Interim Radiochemical Methodology for Drinking Water\*\*".
  - (E) Page 92 of "Radiochemical Analytical Procedures for Analysis of Environmental Samples\*\*".
  - (F) Method 7500-I B\*.
  - (G) Method 7500-I C\*.
  - (H) Method 7500-I D\*.
  - (I) Method 7120\*.
  - (J) Method 4.5.2.3\*.
  - (K) Method D 3649-91\*.
- (8) One (1) of the following methods shall be used to test for radioactive strontium 89 and 90:
  - (A) Method 905.0\*.
  - (B) Page 29 of "Interim Radiochemical Methodology for Drinking Water\*\*".
  - (C) Method Sr-04\*.
  - (D) Page 65 of "Radiochemical Analytical Procedures for Analysis of Environmental Samples\*\*".
  - (E) Method 303\*.
  - (F) Method 7500-Sr B\*.
  - (G) Method R-1160-76\*.
  - (H) Method Sr-01\*.
  - (I) Method Sr-02\*.
- (9) One (1) of the following methods shall be used to test for tritium:
  - (A) Method 906.0\*.
  - (B) Page 34 of "Interim Radiochemical Methodology for Drinking Water\*\*".
  - (C) Method H-02\*.
  - (D) Page 87 of "Radiochemical Analytical Procedures for Analysis of Environmental Samples\*\*".
  - (E) Method 306\*.
  - (F) Method 7500-3H B\*.
  - (G) Method D 4107-91\*.
  - (H) Method R-1171-76\*.
- (10) One (1) of the following methods shall be used to test for gamma emitters:
  - (A) Method 901.1\*.
  - (B) Method 902.0\*.

- (C) Method 901.0\*.
- (D) Page 92 of "Radiochemical Analytical Procedures for Analysis of Environmental Samples\*".
- (E) Method 7120\*.
- (F) Method 7500-Cs B\*.
- (G) Method 7500-I B\*.
- (H) Method D 3649-91\*.
- (I) Method D 4785-93\*.
- (J) Method R-1110-76\*.
- (K) Method Ga-01-R\*.

<sup>1</sup>Natural uranium and thorium-230 are approved as gross alpha calibration standards for gross alpha with coprecipitation and evaporation methods; americium-241 is approved with coprecipitation methods.

<sup>2</sup>If uranium (U) is determined by mass, a 0.67 pCi/μg of uranium conversion factor must be used. This conversion factor is based on the 1:1 activity ratio of U-235 and U-238 that is characteristic of naturally occurring uranium.

(b) When the identification and measurement of radionuclides other than those listed in subsection (a) is required, the following references are to be used, except in cases where alternative methods have been approved in accordance with section 32 of this rule:

- (1) Procedures for Radiochemical Analysis of Nuclear Reactor Aqueous Solutions, H.L. Krieger and S. Gold, EPA-R4-73-014, U.S. EPA, Cincinnati, Ohio, May 1973.
- (2) HASL Procedure Manual, edited by John H. Harley. HASL 300, ERDA Health and Safety Laboratory, New York, New York 1973.

(c) For the purpose of monitoring radioactivity concentrations in drinking water, the required sensitivity of the radioanalysis is defined in terms of a detection limit. The detection limit shall be that concentration that can be counted with a precision of plus or minus one hundred percent (100%) at the ninety-five percent (95%) confidence level (one and ninety-six hundredths (1.96) # where # is the standard deviation of the net counting rate of the sample). Compliance requirements are as follows:

- (1) To determine compliance with section 9(1) of this rule, the detection limit shall not exceed one (1) picocuri per liter.
- (2) To determine compliance with section 9(2) of this rule, the detection limit shall not exceed three (3) picocuri per liter.
- (3) To determine compliance with section 9(3) of this rule, the detection limit shall not exceed one (1) microgram per liter.
- (4) To determine compliance with section 10 of this rule, the detection limits shall not exceed the concentrations listed in the following table:

Detection limits for manmade beta particle and photon emitters:

Radionuclide	Detection limit
Tritium	1,000 pCi/l
Strontium-89	10 pCi/l
Strontium-90	2 pCi/l
Iodine-131	1 pCi/l
Cesium-134	10 pCi/l
Gross beta	4 pCi/l
Other radionuclides	1/10 of the applicable limit

(d) To determine compliance with the MCL listed in sections 9 through 10 of this rule, averages of data shall be used and shall be rounded to the same number of significant figures as the MCL for the contaminant in question.

\*The methods referenced in this section may be obtained as follows:

- (1) Methods 900.0, 903.1, 903.0, 904.0, 908.0, 908.1, 901.0, 901.1, 902.0, 905.0, and 906.0 may be found in "Prescribed Procedures for Measurement of Radioactivity in Drinking Water", EPA 600/4-80-032, August 1980, PB 80-224744. Available from U.S. Department of Commerce, National Technical Information Service (NTIS), 5285 Port Royal Road, Springfield, Virginia 22161, 800-553-6847.
- (2) "Interim Radiochemical Methodology for Drinking Water", EPA 600/4-75-008 (revised), March 1976, PB 253258. Available from U.S. Department of Commerce, National Technical Information Service (NTIS), 5285 Port Royal Road, Springfield, Virginia 22161, 800-553-6847.
- (3) Methods 00-01, 00-02, Ra-04, Ra-03, Ra-05, 00-07, Sr-04, and H-02 may be found in "Radiochemistry

Procedures Manual", EPA 520/5-84-006, December 1987, PB 84-215581. Available from U.S. Department of Commerce, National Technical Information Service (NTIS), 5285 Port Royal Road, Springfield, Virginia 22161, 800-553-6847.

(4) "Radiochemical Analytical Procedures for Analysis of Environmental Samples", March 1979, EMSL LV 053917. Available from U.S. Department of Commerce, National Technical Information Service (NTIS), 5285 Port Royal Road, Springfield, Virginia 22161, 800-553-6847.

(5) Methods 302, 303, 304, 305, 306, 3125, 7110 B, 7110 C, 7120, 7500-Ra C, 7500-Ra B, 7500-Ra D, 7500-U B, 7500-Cs B, 7500-I B, 7500-I C, 7500-I D, 7500-Sr B, 7500-U C, and 7500-3H B may be found in "Standard Methods for the Analysis of Water and Wastewater", 13th, 17th, 18th, 19th, or 20th Editions, 1971, 1989, 1992, 1995, and 1998. Available from American Public Health Association, 1015 Fifteenth Street NW, Washington, D.C. 20005. Methods 302, 303, 304, 305, and 306 are only in the 13th Edition. Methods 7110B, 7500-Ra B, 7500-Ra C, 7500-Ra D, 7500-U B, 7500-Cs B, 7500-I B, 7500-I C, 7500-I D, 7500-Sr B, and 7500-3H C are in the 17th, 18th, 19th, and 20th Editions. Method 7110 C is in the 18th, 19th, and 20th Editions. Method 7500-U C (Fluorometric Uranium) is only in the 17th Edition, and Method 7500-U C (Alpha Spectrometry) is only in the 18th, 19th, and 20th Editions. Method 7120 is only in the 19th and 20th Editions. Method 3125 is only in the 20th Edition.

(6) Methods D 2459-72, D 3649-91, and D 4107-91 may be found in Annual Book of ASTM Standards, Vol 11.02, 1994. Available from American Society of Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, Pennsylvania 19428. Any Annual Book containing the cited version of the method may be used.

(7) Methods D 3454-97, D 2460-97, D 2907-97, D 3972-97, and D 5174-97 may be found in Annual Book of ASTM Standards, Vol. 11.01 and 11.02, 1999. Available from American Society of Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, Pennsylvania 19428. Any Annual Book containing the cited version of the method may be used.

(8) Method D 5673-03 may be found in Annual Book of ASTM Standards, Vol. 11.02, May 2004. Available from American Society of Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, Pennsylvania 19428. Any Annual Book containing the cited version of the method may be used.

(9) Methods R-1120-76, R-1141-76, R-1140-76, R-1142-76, R-1180-76, R-1181-76, R-1182-76, R-1111-76, R-1110-76, R-1160-76, and R-1171-76 may be found in "Methods for Determination of Radioactive Substances in Water and Fluvial Sediments", Chapter A5 in Book 5 of Techniques of Water-Resources Investigations of the United States Geological Survey, 1977. Available from U.S. Geological Survey (USGS) Information Services, Box 25286, Federal Center, Denver, Colorado 80225-0425.

(10) Methods U-04, U-2, Ra-04, Ra-05, 4.5.2.3, Sr-01, Sr-02, and Ga-01-R may be found in "EML Procedures Manual", 27th Edition, Volume 1, 1990 or 28th Edition, Volumes 1 and 2, 1997. Either edition may be used. In the 27th Edition, Method Ra-04 is listed as Ra-05 and Method Ga-01-R is listed as Sect. 4.5.2.3. Available from Environmental Measurements Laboratory, U.S. Department of Energy (DOE), 376 Hudson Street, New York, New York 10014-3621.

(11) New York Methods may be found in "Determination of Ra-226 and Ra-228 (Ra-02)", January 1980, Revised June 1982. Available from Radiological Sciences Institute Center for Laboratories and Research, New York State Department of Health, Empire State Plaza, Albany, New York 12201.

(12) New Jersey Method may be found in "Determination of Radium 228 in Drinking Water", August 1980. Available from State of New Jersey, Department of Environmental Protection, Division of Environmental Quality, Bureau of Radiation and Inorganic Analytical Services, 9 Ewing Street, Trenton, New Jersey 08625.

(13) For uranium ICP-MS Method 200.8, refer to "Determination of Trace Elements in Waters and Wastes by Inductively Coupled Plasma-Mass Spectrometry", Revision 5.4, published in "Methods for the Determination of Metals in Environmental Samples- Supplement I", EPA 600-R-94-111, May 1994. Available at NTIS PB 95-125472.

(Water Pollution Control Board; [327 IAC 8-2-10.1](#); filed Dec 28, 1990, 5:10 p.m.: 14 IR 1028; errata filed Aug 6, 1991, 3:45 p.m.: 14 IR 2258; filed Jul 23, 2001, 1:02 p.m.: 24 IR 3971; filed Jun 13, 2005, 2:30 p.m.: 28 IR 3209; errata filed Jul 6, 2005, 3:15 p.m.: 28 IR 3582)

SECTION 7. [327 IAC 8-2-45](#) IS AMENDED TO READ AS FOLLOWS:

**[327 IAC 8-2-45](#) Analytical methods; lead and copper**

**Authority:** [IC 13-13-5](#); [IC 13-14-8-7](#); [IC 13-14-9](#); [IC 13-18-3](#); [IC 13-18-16](#)

**Affected:** [IC 13-11-2](#); [IC 13-14-8](#); [IC 13-18-1](#); [IC 13-18-2](#)

Sec. 45. (a) Analysis for lead, copper, pH, conductivity, calcium, alkalinity, orthophosphate, silica, and

temperature shall be conducted using the following methods **or with the alternative methods listed in Appendix A to Subpart C of 40 CFR 141:**

- (1) Lead as follows:
  - (A) Atomic absorption; furnace technique, Method D 3559-90D<sup>1</sup>\*, Method D 3559-96\*, or Method 3113B<sup>1</sup>.\*
  - (B) Inductively-coupled plasma; mass spectrometry, Method 200.8\*.
  - (C) Atomic absorption; platform furnace technique, Method 200.9<sup>1</sup>\*.
  - (D) Differential pulse anodic stripping voltammetry, Method 1001\*.
- (2) Copper as follows:
  - (A) Atomic absorption; furnace technique, Method D 1688-90C\*, Method D 1688-95C\*, or Method 3113B\*.
  - (B) Atomic absorption; direct aspiration, Method D 1688-90A\*, Method D 1688-95A\*, or Method 3111B\*.
  - (C) Inductively-coupled plasma; Method 200.7\* or Method 3120B\*.
  - (D) Inductively-coupled plasma; mass spectrometry, Method 200.8\*.
  - (E) Atomic absorption; platform furnace, Method 200.9\*.
- (3) pH, electrometric, Method 150.1\*, Method 150.2\*, Method D 1293-84\*, Method D 1293-95\*, or Method 4500-H<sup>+</sup>-B\*.
- (4) Conductivity, conductance, Method D 1125-91A\*, Method D 1125-95A\*, or Method 2510B\*.
- (5) Calcium as follows:
  - (A) EDTA titrimetric, Method D 511-93A\* or Method 3500-Ca-D\*.
  - (B) Atomic absorption; direct aspiration, Method D 511-93B\* or Method 3111-B\*.
  - (C) Inductively-coupled plasma, Method 200.7 or Method 3120B\*.
- (6) Alkalinity as follows:
  - (A) Titrimetric, Method D 1067-92B\* or Method 2320B.
  - (B) Electrometric titration, Method I-1030-85\*.
- (7) Orthophosphate, unfiltered, no digestion or hydrolysis as follows:
  - (A) Colorimetric, automated, ascorbic acid, Method 365.1\* or Method 4500-P-F\*.
  - (B) Colorimetric, ascorbic acid, single reagent, Method D 515-88A\* or Method 4500-P-E\*.
  - (C) Colorimetric, phosphomolybdate, Method I-1601-85\* or automated-segmented flow, Method I-2601-90\*, or automated discrete, Method I-2598-85\*.
  - (D) Ion chromatography, Method 300.0\*, Method D 4327-97\*, or Method 4110B\*.
- (8) Silica as follows:
  - (A) Colorimetric, molybdate blue, Method I-1700-85 or automated-segmented flow, Method I-2700-85\*.
  - (B) Colorimetric, Method D 859-88\* or Method D 859-95\*.
  - (C) Molybdosilicate, Method 4500-Si-D\* or Method 4500-SiO<sub>2</sub> C\*.
  - (D) Heteropoly blue, Method 4500-Si-E\* or Method 4500-SiO<sub>2</sub> D\*.
  - (E) Automated method for molybdate-reactive silica, Method 4500-Si-F\* or Method 4500-SiO<sub>2</sub> E\*.
  - (F) Inductively-coupled plasma, Method 200.7\* or Method 3120B\*.
- (9) Temperature, thermometric, Method 2550\*.

<sup>1</sup>Because MDLs reported in EPA Methods 200.7 and 200.9 were determined using a 2× preconcentration step during sample digestion, MDLs determined when samples are analyzed by direct analysis, that is, no sample digestion, will be higher. Preconcentration may be required to direct analysis of lead by Method 200.9, Method 3113 B, and Method D 3559-90D unless multiple in-furnace depositions are made.

(b) Analyses for alkalinity, calcium, conductivity, orthophosphate, pH, silica, and temperature may be performed by any person acceptable to the commissioner. Analyses under this section for lead and copper shall only be conducted by laboratories that have been certified by the EPA or the commissioner. To obtain certification to conduct analysis for lead and copper, laboratories must do the following:

- (1) Successfully analyze (PE) samples that include lead and copper provided by or acceptable to EPA or the commissioner at least once each year by each method for which the laboratory desires certification.
- (2) Achieve quantitative acceptance limits as follows:
  - (A) For lead, plus or minus thirty percent (30%) of the actual amount in the PE sample when the actual amount is greater than or equal to five-hundredths (0.05) milligram per liter.
  - (B) For copper, plus or minus ten percent (10%) of the actual amount in the PE sample when the actual amount is greater than or equal to five-thousandths (0.005) milligram per liter.
- (3) Achieve the method detection limit for lead of one-thousandth (0.001) milligram per liter according to the procedures in Appendix B of 40 CFR 136 (July 1, 1991). This need only be done if the laboratory will be processing source water composite samples under section 39 of this rule.
- (4) Be currently certified by EPA or the state to perform analyses to the specifications described in this subsection.

(c) The commissioner has the authority to allow the use of previously collected monitoring data for purposes of

monitoring if the data were collected and analyzed in accordance with sections 36 through 44 of this rule, this section, and sections 46 and 47 of this rule.

(d) All lead levels measured between the practical quantitation level and the method detection limit must be either reported as measured or they can be reported as one-half (1/2) the practical quantitation level (twenty-five ten-thousandths (0.0025) milligram per liter). All levels below the lead method detection level must be reported as zero (0).

(e) All copper levels measured between the practical quantitation level and the method detection limit must be either reported as measured or they can be reported as one-half (1/2) the practical quantitation level (twenty-five thousandths (0.025) milligram per liter). All levels below the copper method detection limit must be reported as zero (0).

<sup>1</sup>For analyzing lead and copper, the technique applicable to total metals must be used and samples cannot be filtered.

\*Methods referenced in this section may be obtained as follows:

(1) Methods 150.1 and 150.2, may be found in "Methods for Chemical Analysis of Water and Wastes", EPA/600/4-79/020, March 1983, available from NTIS, PB84-128677, U.S. Department of Commerce, 5285 Port Royal Road, Springfield, Virginia 22161.

(2) Methods 200.7, 200.8, and 200.9 may be found in "Methods for the Determination of Metals in Environmental Samples-Supplement 1", EPA-600/R-94-111, May 1994, available from NTIS, PB95-125472, U.S. Department of Commerce, 5285 Port Royal Road, Springfield, Virginia 22161.

(3) Methods D3559-90D, D1688-90C, D1688-90A, D1293-84, D1125-91A, and D859-88 may be found in "Annual Book of ASTM Standards", Vols. 11.01, 1994, American Society for Testing and Materials, available from the American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, Pennsylvania 19428. Any year containing the cited version of the method may be used.

(4) Methods D1067-92B, D511-93A, D511-93B, D1688-95C, D1688-95A, D1125-95A, D3559-96, D515-88A, D4327-91, D1293-95, and D859-95 may be found in "Annual Book of ASTM Standards, Vols. 11.01 and 11.02, 1994 and 1996, available from the American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, Pennsylvania 19428. Any year containing the cited version of the method may be used.

(5) Methods 3113B, 4500-Si-D, 4500-Si-E, and 4500-Si-F may be found in "Standard Methods for the Examination of Water and Wastewater", 18th Edition, 1992, and "Standard Methods for the Examination of Water and Wastewater", 19th Edition, 1995, American Public Health Association, available from the American Public Health Association, 1015 Fifteenth Street NW, Washington, D.C. 20005. Either edition may be used.

(6) Methods 2320B, 3111B, 3120B, 4500-H<sup>+</sup>-B, 2510B, 3500-Ca-D, 2320B, 4500-P-F, 4500-P-E, 4110B, and 2550 may be found in "Standard Methods for the Examination of Water and Wastewater", 18th Edition, 1992, and "Standard Methods for the Examination of Water and Wastewater", 19th Edition, 1995, and "Standard Methods for the Examination of Water and Wastewater", 20th Edition, 1998, American Public Health Association, available from the American Public Health Association, 1015 Fifteenth Street NW, Washington, D.C. 20005. The cited methods published in any of the three (3) editions may be used.

(7) Methods 4500-SiO<sub>2</sub>-C, 4500-SiO<sub>2</sub>-D, and 4500-SiO<sub>2</sub>-E may be found in "Standard Methods for the Examination of Water and Wastewater", 20th Edition, 1998, American Public Health Association, 1015 Fifteenth Street NW, Washington, D.C. 20005.

(8) Methods I-1030-85, I-1601-85, I-2598-85, I-1700-85, and I-2700-85 may be found in "Techniques of Water Resources Investigation of the U.S. Geological Survey", Book 5, Chapter A-1, 3rd Edition, 1989, available from Information Services, U.S. Geological Survey, Federal Center, Box 25286, Denver, Colorado 80225-0425.

(9) Method I-2601-90 may be found in "Methods for Analysis by the U.S. Geological Survey National Water Quality Laboratory - Determination of Inorganic and Organic Constituents in Water and Fluvial Sediments", Open File Report 93-125, 1993, available from Information Services, U.S. Geological Survey, Federal Center, Box 25286, Denver, Colorado 80225-0425.

(10) Methods 365.1 and 300.0 may be found in "Methods for the Determination of Inorganic Substances in Environmental Samples", EPA-600/R-93-100, August 1993, available from NTIS, PB94-120821, U.S. Department of Commerce, 5285 Port Royal Road, Springfield, Virginia 22161.

(11) Method 1001 is available from Palintest, LTC, 21 Kenton Lands Road, P.O. Box 18395, Erlanger, Kentucky 41018 or from the Hach Company, P.O. Box 389, Loveland, Colorado 80539-0389.

These methods are also available for copying at the Indiana Department of Environmental Management, Office of Water Quality, 100 North Senate Avenue, Room N1255, Indianapolis, Indiana 46204.

(Water Pollution Control Board; [327 IAC 8-2-45](#); filed Aug 24, 1994, 8:15 a.m.: 18 IR 82; errata filed Oct 11, 1994, 2:45 p.m.: 18 IR 532; filed Aug 25, 1997, 8:00 a.m.: 21 IR 72; errata filed Dec 10, 1997, 3:45 p.m.: 21 IR 1349;

SECTION 8. [327 IAC 8-2.3-4](#) IS AMENDED TO READ AS FOLLOWS:

**[327 IAC 8-2.3-4](#) Ground water source microbial monitoring and analytical methods**

**Authority:** [IC 13-13-5](#); [IC 13-14-8-7](#); [IC 13-14-9](#); [IC 13-18-3-2](#); [IC 13-18-16](#)

**Affected:** [IC 13-18-3-11](#); [IC 13-18-17](#)

Sec. 4. (a) The following applies to triggered source water monitoring required under this rule:

(1) A ground water system shall conduct triggered source water monitoring if the conditions identified in the following exist:

(A) The system does not provide at least 4-log treatment of viruses using:

(i) inactivation;

(ii) removal; or

(iii) a combination of 4-log virus inactivation and removal approved by the commissioner; before or at the first customer for each ground water source.

(B) The system is notified that:

(i) a sample collected under [327 IAC 8-2-8\(a\)](#) through [327 IAC 8-2-8\(e\)](#) is total coliform-positive; and

(ii) the sample under item (i) is not invalidated under [327 IAC 8-2-8\(f\)](#).

(2) A ground water system shall collect, within twenty-four (24) hours of notification of the total coliform-positive sample under subdivision (1)(B)(i), at least one (1) ground water source sample from each ground water source in use at the time the total coliform-positive sample was collected under [327 IAC 8-2-8\(a\)](#) through [327 IAC 8-2-8\(e\)](#), except as provided in clause (B). The commissioner may approve the following alternatives to this sampling requirement:

(A) The commissioner may extend the twenty-four (24) hour time limit on a case-by-case basis if the system cannot collect the ground water source water sample within twenty-four (24) hours due to circumstances beyond its control. In the case of an extension, the commissioner shall specify how much time the system has to collect the sample.

(B) If:

(i) approved by the commissioner, systems with more than one (1) ground water source may meet the requirements of this subdivision by sampling a representative ground water source or sources; and

(ii) directed by the commissioner, a system shall submit for commissioner approval a triggered source water monitoring plan that:

(AA) identifies one (1) or more ground water sources that are representative of each monitoring site in the system's sample siting plan under [327 IAC 8-2-8\(a\)](#) through [327 IAC 8-2-8\(e\)](#); and

(BB) the system intends to use for representative sampling under this subdivision.

(C) A ground water system that uses a single well and serves one thousand (1,000) people or fewer may use a repeat sample collected from a ground water source to:

(i) meet the requirements of [327 IAC 8-2-8.1](#); and

(ii) satisfy the monitoring requirements of this subdivision;

for only that ground water source if the commissioner approves the use of E. coli as a fecal indicator for source water monitoring under this subsection and the commissioner approves the use of the source water sample to meet the requirements of [327 IAC 8-2-8.1](#). If the repeat sample collected from the ground water source is E. coli positive, the system shall comply with subdivision (3).

(3) If the commissioner does not require corrective action under section 5(a)(2) of this rule for a fecal indicator-positive source water sample:

(A) collected under subdivision (2); and

(B) that is not invalidated under subsection (d);

then the system shall collect five (5) additional source water samples from the same source within twenty-four (24) hours of being notified of the fecal indicator-positive sample.

(4) Consecutive and wholesale systems shall meet the following requirements:

(A) In addition to the other requirements of this subsection, a consecutive ground water system that has a total coliform-positive sample collected under [327 IAC 8-2-8\(a\)](#) through [327 IAC 8-2-8\(e\)](#) shall notify the wholesale system or systems that supply water to the consecutive system within twenty-four (24) hours of being notified of the total coliform-positive sample.

(B) In addition to the other requirements of this subsection, a wholesale ground water system shall do the

following:

(i) A wholesale ground water system that receives notice from a consecutive system it serves that a sample collected under [327 IAC 8-2-8\(a\)](#) through [327 IAC 8-2-8\(e\)](#) is total coliform-positive shall, within twenty-four (24) hours of being notified, do the following:

(AA) Collect a sample from its ground water source or sources under subdivision (2).

(BB) Analyze it for a fecal indicator under subsection (c).

(ii) If the sample collected under item (i) is fecal indicator-positive, the wholesale ground water system shall:

(AA) notify all consecutive systems served by that ground water source of the fecal indicator-positive source water sample result within twenty-four (24) hours of being notified of the ground water source sample monitoring result; and

(BB) meet the requirements of subdivision (3).

(C) Consecutive and wholesale systems shall work together to ensure that the requirements of this subdivision are met.

(5) A ground water system is not required to comply with the source water monitoring requirements of this subsection if either of the following conditions exists:

(A) The commissioner determines and documents, in writing, that the total coliform-positive sample collected under [327 IAC 8-2-8\(a\)](#) through [327 IAC 8-2-8\(e\)](#) is caused by a distribution system deficiency.

(B) The total coliform-positive sample collected under [327 IAC 8-2-8\(a\)](#) through [327 IAC 8-2-8\(e\)](#) is collected at a location that meets criteria set by the commissioner for distribution system conditions that will cause total coliform-positive samples.

(b) If directed by the commissioner, a ground water system shall conduct assessment source water monitoring that meets the following:

(1) The requirements shall be determined by the commissioner for assessment source water monitoring.

(2) A ground water system conducting assessment source water monitoring may use a triggered source water sample collected under subsection (a)(2) to meet the requirements of this subsection.

(3) Assessment source water monitoring requirements determined by the commissioner may include the following:

(A) Collection of at least:

(i) one (1) ground water source sample per month; or

(ii) if operating fewer than twelve (12) months, twelve (12) samples split evenly through the period of operation representing each month the system provides ground water to the public.

(B) Collection of samples from each well unless the system obtains written approval from the commissioner to conduct monitoring at one (1) or more wells within the ground water system that:

(i) are representative of multiple wells used by that system; and

(ii) draw water from the same hydrogeologic setting.

(C) Collection of a standard sample volume of at least one hundred (100) milliliters for fecal indicator analysis regardless of the fecal indicator or analytical method used.

(D) Analysis of all ground water source samples using one (1) of the analytical methods listed in subsection (c)(2) for the presence of:

(i) *E. coli*;

(ii) enterococci; or

(iii) coliphage.

(E) Collection of ground water source samples at a location prior to any treatment of the ground water source unless the commissioner approves a sampling location after treatment.

(F) Collection of ground water source samples at the well unless the:

(i) system's configuration does not allow for sampling at the well; and

(ii) commissioner approves an alternate sampling location that is representative of the water quality of that well.

(c) The following analytical methods and requirements apply under this rule:

(1) A ground water system subject to the triggered source water monitoring requirements of subsection (a) shall collect a standard sample volume of at least one hundred (100) milliliters for fecal indicator analysis regardless of the fecal indicator or analytical method used.

(2) A ground water system shall analyze all ground water source samples collected under subsection (a) using one (1) of the analytical methods listed in the following table **or with the alternative methods listed in Appendix A to Subpart C of 40 CFR 141** for the presence of *E. coli*, enterococci, or coliphage:

Analytical Methods for Source Water Monitoring
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Fecal indicator <sup>1</sup>	Methodology	Method Citation*
E. coli	Colilert <sup>2</sup>	9223 B
	Colisure <sup>2</sup>	9223 B
	Membrane Filter Method with MI Agar	EPA Method 1604
	m-ColiBlue24 Test	
	E*Colite Test	
	EC-MUG <sup>3</sup>	9221 F
Enterococci	NA-MUG <sup>3</sup>	9222 G
	Multiple Tube Technique	9230 B
	Membrane Filter Technique	9230 C
	Membrane Filter Technique	EPA Method 1600
Coliphage	Enterolert	
	Two-Step Enrichment Presence-Absence Procedure	EPA Method 1601
	Single Agar Layer Procedure	EPA Method 1602

<sup>1</sup>The time from sample collection to initiation of analysis may not exceed thirty (30) hours. The ground water system is encouraged, but is not required, to hold samples below ten (10) degrees Centigrade during transit.

<sup>2</sup>Medium is available through IDEXX Laboratories, Inc., One IDEXX Drive, Westbrook, ME 04092.

<sup>3</sup>EC-MUG (Method 9221F) or NA-MUG (Method 9222G) can be used for E. coli testing step as described in [327 IAC 8-2-8.4\(a\)\(5\)\(A\)](#) or [327 IAC 8-2-8.4\(a\)\(5\)\(B\)](#) after use of Standard Methods 9221 B, 9221 D, 9222 B, or 9222 C.

(d) The commissioner may invalidate a fecal indicator-positive ground water source sample collected under subsection (a) if one (1) of the following occurs:

- (1) The system provides the commissioner with written notice from the laboratory that improper sample analysis occurred.
- (2) The commissioner determines and documents in writing that there is substantial evidence that a fecal indicator-positive ground water source sample is not related to source water quality.

(e) Any ground water source sample required under subsection (a) must be collected at:

- (1) a location prior to any treatment of the ground water source or after treatment only if that sampling location is approved by the commissioner; and
- (2) the well unless the:
  - (A) system's configuration does not allow for sampling at the well; and
  - (B) commissioner approves an alternate sampling location that:
    - (i) meets the requirements of subsection (a); and
    - (ii) is representative of the water quality of that well.

(f) If directed by the commissioner, a ground water system that places a new ground water source into service after November 30, 2009, shall:

- (1) conduct assessment source water monitoring under subsection (b); and
- (2) begin monitoring before the ground water source is used to provide water to the public.

(g) A ground water system with a ground water source sample collected under subsection (a) or (b) that is:

- (1) fecal indicator-positive; and
- (2) not invalidated under subsection (d);

including consecutive systems served by the ground water source, shall conduct public notification under [327 IAC 8-2.1-8](#).

(h) Failure to meet the requirements of subsections (a) through (f):

- (1) is a monitoring violation; and
- (2) requires the ground water system to provide public notification under [327 IAC 8-2.1-10](#).

\*The methods referenced in this section are incorporated by reference and can be obtained as follows:

(1) Methods 9221 F, 9222 G, 9223 B, 9230 B, and 9230 C are described in Standard Methods for the Examination of Water and Wastewater 20th Edition (1998), and copies can be obtained from the American Public Health Association, 1015 Fifteenth Street, Washington, D.C. 20005-2605.

(2) EPA Method 1604: Total Coliforms and Escherichia coli in Water by Membrane Filtration Using a Simultaneous Detection Technique (MI Medium); September 2002, EPA 821-R-02-024. Method is available at <http://www.epa.gov/nerlcwww/1604so02.pdf> or from EPA's Water Resource Center (RC-4100T), 1200 Pennsylvania Avenue NW, Washington, D.C. 20005-2605.

(3) A description of the m-ColiBlue24 Test, "Total Coliforms and E. coli Membrane Filtration Method with m-ColiBlue24 Broth", Method No. 10029 Revision 2, August 17, 1999, is available from Hach Company, 100 Dayton Avenue, Ames, IA 50010 or from EPA's Water Resource Center (RC-4100T), 1200 Pennsylvania Avenue NW, Washington, D.C. 20460.

(4) A description of the E\*Colite Test, "Charm E\*Colite Presence/Absence Test for Detection and Identification of Coliform Bacteria and Escherichia coli in Drinking Water", January 9, 1998, is available from Charm Sciences, Inc., 659 Andover Street, Lawrence, MA 01843-1032 or from EPA's Water Resource Center (RC-4100T), 1200 Pennsylvania Avenue NW, Washington, D.C. 20460.

(5) EPA Method 1600: Enterococci in Water by Membrane Filtration Using membrane-Enterococcus Indoxyl-b-D-Glucoside Agar (mEI) EPA 821-R-02-022 (September 2002) is an approved variation of Standard Method 9230C. The method is available at <http://www.epa.gov/nerlcwww/1600sp02.pdf> or from EPA's Water Resource Center (RC-4100T), 1200 Pennsylvania Avenue NW, Washington, D.C. 20460. The holding time and temperature for ground water samples are specified in footnote 1 above, rather than as specified in Section 8 of EPA Method 1600.

(6) EPA Method 1601: Male-specific (F+) and Somatic Coliphage in Water by Two-step Enrichment Procedure; April 2001, EPA 821-R-01-030. Method is available at <http://www.epa.gov/nerlcwww/1601ap01.pdf> or from EPA's Water Resource Center (RC-4100T), 1200 Pennsylvania Avenue NW, Washington, D.C. 20460.

(7) EPA Method 1602: Male-specific (F+) and Somatic Coliphage in Water by Single Agar Layer (SAL) Procedure; April 2001, EPA 821-R-01-029. Method is available at <http://www.epa.gov/nerlcwww/1602ap01.pdf> or from EPA's Water Resource Center (RC-4100T), 1200 Pennsylvania Avenue NW, Washington, D.C. 20460.

The methods are also available for copying at the Indiana Department of Environmental Management, Office of Water Quality, Indiana Government Center North, 100 North Senate Avenue, Room N1255, Indianapolis, Indiana 46204.

(Water Pollution Control Board; [327 IAC 8-2.3-4](#); filed May 7, 2010, 9:30 a.m.: [20100602-IR-327080198FRA](#); errata filed Jul 2, 2010, 1:12 p.m.: [20100714-IR-327100432ACA](#))

SECTION 9. [327 IAC 8-2.5-5](#) IS AMENDED TO READ AS FOLLOWS:

**[327 IAC 8-2.5-5](#) Analytical requirements; disinfectant residuals, disinfection byproducts, and disinfection byproducts precursors**

**Authority:** [IC 13-13-5-1](#); [IC 13-14-8-2](#); [IC 13-14-8-7](#); [IC 13-18-3-2](#)

**Affected:** [IC 13-12-3-1](#); [IC 13-13-5-2](#); [IC 13-14-9](#); [IC 13-18-11](#)

Sec. 5. (a) Systems shall use only one (1) or more of the analytical methods specified in this subsection or an EPA-approved equivalent method to demonstrate compliance with this rule. These methods are incorporated by reference and may be obtained as follows:

(1) EPA Method 552.1 is in Methods for the Determination of Organic Compounds in Drinking Water-Supplement II, U.S. EPA, August 1992, EPA/600/R-92/129 (available through National Information Technical Service (NTIS), PB92-207703).

(2) EPA Methods 502.2, 524.2, 551.1, and 552.2 are in Methods for the Determination of Organic Compounds in Drinking Water-Supplement III, U.S. EPA, August 1995, EPA/600/R-95/131 (available through NTIS, PB95-261616).

(3) EPA Methods 300.0 and 150.1 are in Methods for the Determination of Inorganic Substances in Environmental Samples, U.S. EPA, August 1993, EPA/600/R-93/100 (available through NTIS, PB94-121811).

(4) EPA Methods 300.1 and 321.8 are in Methods for the Determination of Organic and Inorganic Compounds in Drinking Water Volume 1, U.S. EPA, August 2000, EPA 815-R-00-014 (available through NTIS, PB2000-106981).

(5) EPA Method 317.0, Revision 2.0, "Determination of Inorganic Oxyhalide Disinfection By-Products in Drinking Water Using Ion Chromatography with the Addition of a Postcolumn Reagent for Trace Bromate

Analysis", **Analysis**", U.S. EPA, July 2001, EPA 815-B-01-001 may be accessed and downloaded directly online at <http://www.epa.gov/safewater/methods/sourcalt.html>.

(6) EPA Method 326.0, Revision 1.0, "Determination of Oxyhalide Disinfection By-Products in Drinking Water Using Ion Chromatography Incorporating the Addition of a Suppressor Acidified Postcolumn Reagent for Trace Bromate Analysis", U.S. EPA, June 2002, EPA 815-R-03-007 may be accessed and downloaded directly online at <http://www.epa.gov/safewater/methods/sourcalt.html>.

(7) EPA Method 327.0, Revision 1.1, "Determination of Chlorine Dioxide and Chlorite Ion in Drinking Water Using Lissamine Green B and Horseradish Peroxidase with Detection by Visible Spectrophotometry", U.S. EPA, May 2005, EPA 815-R-05-008 may be accessed and downloaded directly online at <http://www.epa.gov/safewater/methods/sourcalt.html>.

(8) EPA Method 552.3, Revision 1.0. "Determination of Haloacetic Acids and Dalapon in Drinking Water by Liquid-liquid Microextraction, Derivatization, and Gas Chromatography with Electron Capture Detection", U.S. EPA, July 2003, EPA 815-B-03-002 may be accessed and downloaded directly online at <http://www.epa.gov/safewater/methods/sourcalt.html>.

(9) EPA Method 415.3, Revision 1.1, "Determination of Total Organic Carbon and Specific UV Absorbance at 254 nm in Source Water and Drinking Water", U.S. EPA, February 2005, EPA/600-R-05/055 may be accessed and downloaded directly online at <http://www.epa.gov/nerlcwww/ordmeth.html>.

(10) EPA Method 200.7 is found in "Methods for the Determination of Metals in Environmental Samples - Supplement I", U.S. EPA, May 1994, EPA 600-R-94-111 (available through NTIS PB95-125472).

(11) Standard Methods 3111 B and 3500-Mg E must be followed in accordance with Standard Methods for the Examination of Water and Wastewater, 18th Edition or 19th Edition, American Public Health Association, 1992 and 1995, respectively. The cited method published in either edition may be used. Copies may be obtained from the American Public Health Association, 1015 Fifteenth Street NW, Washington, D.C. 20005.

(12) Standard Method 3120 B must be followed in accordance with the Standard Methods for the Examination of Water and Wastewater, 18th Edition, 19th Edition, or 20th Edition, American Public Health Association, 1992, 1995, and 1998 respectively. The cited method published in any of these three (3) editions may be used. Copies may be obtained from the American Public Health Association, 1015 Fifteenth Street NW, Washington, D.C. 20005.

(13) Standard Methods 4500-Cl D, 4500-Cl E, 4500-Cl F, 4500-Cl G, 4500-Cl H, 4500-Cl I, 4500-ClO<sub>2</sub> D, 4500-ClO<sub>2</sub> E, 4500-H<sup>+</sup> B, 6251 B, and 5910 B shall be followed in accordance with Standard Methods for the Examination of Water and Wastewater, 19th Edition or 20th Edition, American Public Health Association, 1996 and 1998, respectively. The cited methods published in either edition may be used. Copies may be obtained from the American Public Health Association, 1015 Fifteenth Street NW, Washington, D.C. 20005.

(14) Standard Method 3500-Mg B must be followed in accordance with Standard Methods for the Examination of Water and Wastewater, 20th Edition, American Public Health Association, 1998. Copies may be obtained from the American Public Health Association, 1015 Fifteenth Street NW, Washington, D.C. 20005.

(15) Standard Methods 5310 B, 5310 C, and 5310 D shall be followed in accordance with the Supplement to the 19th Edition of Standard Methods for the Examination of Water and Wastewater, American Public Health Association, 1996 or the Standard Methods for the Examination of Water and Wastewater, 20th Edition, 1998. The cited methods published in either edition may be used. Copies may be obtained from the American Public Health Association, 1015 Fifteenth Street NW, Washington, D.C. 20005.

(16) Standard Methods 4500-Cl D-00, 4500-Cl E-00, 4500-Cl F-00, 4500-Cl G-00, 4500-Cl H-00, 4500-Cl I-00, 4500-ClO<sub>2</sub> E-00, 6251 B-94, 5310 B-00, 5310 C-00, 5310 D-00, and 5910 B-00 are available at <http://www.standardmethods.org> or at EPA's Water Docket at 1301 Constitution Avenue NW, EPA West, Room B, Washington, D.C. 20460. The year in which each method was approved by the Standard Methods Committee is designated by the last two (2) digits in the method number. The methods listed are the only online versions that are IBR-approved.

(17) ASTM Methods D 1253-86 and D 1253-86 (reapproved 1996) shall be followed in accordance with the Annual Book of ASTM Standards, Volume 11.01, American Society for Testing and Materials, 1996 edition, or any ASTM edition containing the IBR-approved version of the method may be used. Copies may be obtained from the American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, Pennsylvania 19428.

(18) ASTM Methods D 511-93A and D 511-93B shall be followed in accordance with the Annual Book of ASTM Standards, Volumes 11.01 and 11.02, American Society for Testing and Materials, 1994, 1996, 1999, or any ASTM edition containing the IBR-approved version of the method may be used. Copies may be obtained from the American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, Pennsylvania 19428.

(19) ASTM Method D 1253-03 shall be followed in accordance with the Annual Book of ASTM Standards, Volume 11.01, American Society for Testing and Materials, 2004 or any ASTM edition containing the IBR-approved version of the method may be used. Copies may be obtained from the American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, Pennsylvania 19428.

(20) ASTM Method D 6581-00 shall be followed in accordance with the Annual Book of ASTM Standards, Volume 11.01, American Society for Testing and Materials, 2001 or any ASTM edition containing the IBR-approved version of the method may be used. Copies may be obtained from the American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, Pennsylvania 19428.

These methods are also available for copying at the Indiana Department of Environmental Management, Office of Water Quality, 100 North Senate Avenue, Room N1255, Indianapolis, Indiana 46204.

(b) Analytical requirements for disinfection byproducts are as follows:

(1) Systems shall measure disinfection byproducts by the methods, as modified by the footnotes, listed in the following tables **or with the alternative methods listed in Appendix A to Subpart C of 40 CFR 141:**

APPROVED METHODS FOR DISINFECTION BYPRODUCT COMPLIANCE MONITORING				
Methodology <sup>1</sup>	EPA Method	Standard Method	SM Online <sup>8</sup>	ASTM Method <sup>3</sup>
P & T/GC/EICD & PID	502.2 <sup>4</sup>			
P & T/GC/MS	524.2			
LLE/GC/ECD	551.1			
LLE (diazomethane)		6251 B <sup>5</sup>	6251B-94	
SPE (acidic methanol)/GC/ECD	552.1 <sup>5</sup>			
LLE (acidic methanol)/GC/ECD	552.2, 552.3			
IC and post column reaction	317.0, Rev 2.0 <sup>6</sup> , 326.0 <sup>6</sup>			
IC/ICP-MS	321.8 <sup>6,7</sup>			
Spectrophotometry	327.0, Rev 1.1 <sup>8</sup>			
Amperometric titration		4500-ClO <sub>2</sub> E <sup>8</sup>	4500-ClO <sub>2</sub> E - 00 <sup>8</sup>	
IC	300.1, 317.0, Rev 2.0, 326.0			
IC	300.1			D6581-00

<sup>1</sup>P & T = purge and trap; GC = gas chromatography; EICD = electrolytic conductivity detector; PID = photoionization detector; MS = mass spectrometer; LLE = liquid/liquid extraction; ECD = electron capture detector; SPE = solid phase extractor; IC = ion chromatography.

<sup>2</sup> 19th and 20th Editions of Standard Methods for the Examination of Water and Wastewater, 1995 and 1998, respectively, American Public Health Association; either of these editions may be used.

<sup>3</sup>Annual Book of ASTM Standards, 2001 or any year containing the cited version of the method, Vol 11.01.

<sup>4</sup>If TTHMs are the only analytes being measured in the sample, then a PID is not required.

<sup>5</sup>The samples must be extracted within fourteen (14) days of sample collection.

<sup>6</sup>Ion chromatography and post column reaction or IC-ICP/MS must be used for monitoring of bromate for purposes of demonstrating eligibility of reduced monitoring, as prescribed in section 6(b)(3)(B) of this rule.

<sup>7</sup>Samples must be preserved at the time of sampling with fifty (50) mg ethylenediamine (EDA)/L of sample and must be analyzed within twenty-eight (28) days.

<sup>8</sup>The Standard Methods Online version that is approved is indicated by the last two (2) digits in the method number, which is the year of approval by the Standard Methods Committee. Standard Methods Online are available at <http://www.standardmethods.org>.

#### METHODOLOGY APPROVED FOR EACH BYPRODUCT MEASURED<sup>1</sup>

Methodology <sup>1</sup>	TTHM	HAA5	Chlorite <sup>2</sup>	Bromate
P & T/GC/E1CD & PID	X			
P & T/GC/MS	X			
LLE/GC/ECD	X			
LLE (diazomethane)		X		
SPE (acidic methanol)/GC/ ECD		X		
LLE (acidic methanol)/GC/ ECD		X		
IC and post column reaction			X	
IC/ICP-MS				X
Spectrophotometry				X
Amperometric titration			X	
IC			X	
IC			X	X

<sup>1</sup>X indicates method is approved for measuring specified disinfection byproduct.

<sup>2</sup>Amperometric titration may be used for routine daily monitoring of chlorite at the entrance to the distribution system, as prescribed in section 6(b)(2)(A)(i) of this rule. Ion chromatography must be used for routine monthly monitoring of chlorite and additional monitoring of chlorite in the distribution system, as prescribed in section 6(b)(2)(A)(ii) and 6(b)(2)(B) of this rule.

(2) Analysis under this subsection for disinfection byproducts must be conducted by laboratories that have received certification by EPA or the commissioner, except as specified under subdivision (3). To receive certification to conduct analyses for the DBP contaminants in sections 2(a) and 9 through 20 of this rule, the laboratory must do the following:

(A) Analyze performance evaluation (PE) samples approved by EPA or the commissioner at least once during each consecutive twelve (12) month period by each method for which the laboratory desires certification.

(B) Until March 31, 2007, in these analyses of PE samples, the laboratory must achieve quantitative results within the acceptance limit on a minimum of eighty percent (80%) of the analytes included in each PE sample. The acceptance limit is defined as the ninety-five percent (95%) confidence interval calculated around the mean of the PE study data between a maximum and minimum acceptance limit of plus or minus fifty percent (50%) and plus or minus fifteen percent (15%) of the study mean.

(C) Beginning April 1, 2007, the laboratory must achieve quantitative results on the PE sample analyses that are within the acceptance limits shown in the following table:

DBP Group	DBP	Acceptance Limits (percent of true value)	Comments
TTHM	Chloroform	± 20	Laboratory shall meet all four (4) individual THM acceptance limits in order to successfully pass a PE sample for TTHM
	Bromodichloromethane	± 20	
	Dibromochloromethane	± 20	
	Bromoform	± 20	
HAA5	Monochloroacetic acid	± 40	Laboratory shall meet the acceptance limit for four (4) out of five (5) of the HAA5 compounds in order to successfully pass a PE sample for HAA5
	Dichloroacetic acid	± 40	
	Trichloroacetic acid	± 40	
	Monobromoacetic acid	± 40	
	Dibromoacetic acid	± 40	
	Chlorite	± 30	
	Bromate	± 30	

(D) Beginning April 1, 2007, the laboratory must report quantitative data for concentrations at least as low as the ones listed in the following table for all DBP samples analyzed for compliance with sections 9 through 20 of this rule:

DBP Group	DBP	Minimum Reporting Level (mg/L) <sup>1</sup>	Comments
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TTHM <sup>2</sup>	Chloroform	0.0010	
	Bromodichloromethane	0.0010	
	Dibromochloromethane	0.0010	
	Bromoform	0.0010	
HAA5 <sup>2</sup>	Monochloroacetic acid	0.0020	
	Dichloroacetic acid	0.0010	
	Trichloroacetic acid	0.0010	
	Monobromoacetic acid	0.0010	
	Dibromoacetic acid	0.0010	
	Chlorite	0.020	Applicable to monitoring as prescribed in <a href="#">327 IAC 8-2.5-6(b)(2)(A)(ii)</a> and <a href="#">327 IAC 8-2.5-6(b)(2)(B)</a>
	Bromate	0.0050 or 0.0010	Laboratories that use EPA Methods 317.0, Revision 2.0, 326.0 or 321.8 shall meet 0.010 mg/L MRL for bromate.

<sup>1</sup>The calibration curve must encompass the regulatory minimum reporting level (MRL) concentration. Data can be reported by concentrations lower than the regulatory MRL as long as the precision and accuracy criteria are met by analyzing an MRL check standard at the lowest reporting limit chosen by the laboratory. The laboratory shall verify the accuracy of the calibration curve at the MRL concentration by analyzing an MRL check standard with a concentration less than or equal to one hundred ten percent (110%) of the MRL with each batch of samples. The measured concentration of the MRL check standard must be plus or minus fifty percent ( $\pm 50\%$ ) of the expected value if any field sample in the batch has a concentration less than five (5) times the regulatory MRL. Method requirements to analyze higher concentration check standards and meet tighter acceptance criteria for them must be met in addition to the MRL check standard requirement.

<sup>2</sup>When adding the individual THM or haloacetic acid concentrations to calculate the TTHM or HAA5 concentrations, respectively, a zero (0) is used for any analytical result that is less than the MRL for that DBP, unless otherwise specified by the commissioner.

(3) A certified operator or other party as approved by the commissioner shall measure daily chlorite samples at the entrance to the distribution system.

(c) Analytical requirements for disinfectant residuals are as follows:

(1) A system shall measure residual disinfectant concentrations for free chlorine, combined chlorine (chloramines), and chlorine dioxide by the methods listed in the following tables **or with the alternative methods listed in Appendix A to Subpart C of 40 CFR 141:**

APPROVED METHODS FOR DISINFECTANT RESIDUAL COMPLIANCE MONITORING				
Methodology	Standard Method (19th or 20th Edition)	SM Online <sup>1</sup>	ASTM Method	EPA Method
Amperometric titration	4500-Cl D	4500-Cl D-00	D 1253-86 (96), 03	
Low level amperometric titration	4500-Cl E	4500-Cl E-00		
DPD <sup>2</sup> ferrous titrimetric	4500-Cl F	4500-Cl F-00		
DPD <sup>2</sup> colorimetric	4500-Cl G	4500-Cl G-00		
Syringaldazine (FACTS)	4500-Cl H	4500-Cl H-00		
Iodometric electrode	4500-Cl I	4500-Cl I-00		
DPD <sup>2</sup>	4500-ClO <sub>2</sub> D			

Amperometric method II	4500-ClO <sub>2</sub> E	4500-ClO <sub>2</sub> E-00		
Lissamine green spectrophotometric				327.0, Rev 1.1

<sup>1</sup>The Standard Methods Online version that is approved is indicated by the last two (2) digits in the method number, which is the year of approval by the Standard Methods Committee. Standard Methods Online are available at <http://www.standardmethods.org>.

<sup>2</sup>DPD means N,N-diethyl-4-phenylene diamine.

METHODOLOGY APPROVED FOR EACH DISINFECTANT RESIDUAL MEASURED <sup>1</sup>				
Methodology	Free Chlorine	Combined Chlorine	Total Chlorine	Chlorine Dioxide
Amperometric titration	X	X	X	
Low level amperometric titration			X	
DPD <sup>2</sup> ferrous titrimetric	X	X	X	
DPD <sup>2</sup> colorimetric	X	X	X	
Syringaldazine (FACT)	X			
Iodometric electrode			X	
DPD <sup>2</sup>				X
Amperometric method ii				X
Lissamine green spectrophotometric				X

<sup>1</sup>X indicates method is approved for measuring specified disinfectant residual.

<sup>2</sup>DPD means N,N-diethyl-4-phenylene diamine.

(2) If approved by the commissioner, a system may also measure residual disinfectant concentrations for chlorine, chloramines, and chlorine dioxide by using DPD colorimetric test kits.

(3) Residual disinfectant concentration may be measured only by a certified operator or a party approved by the commissioner.

(d) Systems required to analyze parameters not included in subsections (b) and (c) shall use the following methods **or with the alternative methods listed in Appendix A to Subpart C of 40 CFR 141:**

(1) All methods allowed in [327 IAC 8-2-45](#) for measuring alkalinity and pH.

(2) A system shall use one (1) or more of the following methods for bromide:

- (A) EPA Method 300.0.
- (B) EPA Method 300.1.
- (C) EPA Method 317.0, Revision 2.0.
- (D) EPA Method 326.0, Revision 1.0.
- (E) ASTM Method D 6581-00.

(3) A system shall use one (1) or more of the following methods for TOC:

- (A) Standard Method 5310 B or 5130 B-00 (High-Temperature Combustion Method).
- (B) Standard Method 5310 C or 5130 C-00 (Persulfate-Ultraviolet or Heated-Persulfate Oxidation Method).
- (C) Standard Method 5310 D or 5130 D-00 (Wet-Oxidation Method).
- (D) EPA Method 415.3, Revision 1.1.

Inorganic carbon must be removed from the samples prior to analysis. TOC samples may not be filtered prior to analysis. TOC samples must be acidified at the time of sample collection to achieve pH less than two (2.0) by minimal addition of the acid specified in the method or by the instrument manufacturer. Acidified TOC samples must be analyzed within twenty-eight (28) days.

(4) SUVA means specific ultraviolet absorption at two hundred fifty-four (254) nanometers, an indicator of the humic content of water. It is a calculated parameter obtained by dividing a sample's ultraviolet absorption at a wavelength of two hundred fifty-four (254) nanometers ( $UV_{254}$ ) (in  $m^{-1}$ ) by its concentration of dissolved organic carbon (DOC) (in milligrams per liter). In order to determine SUVA,  $UV_{254}$  and DOC must be measured separately. When determining SUVA, a system shall use the following methods:

- (A) A system shall use one (1) or more of the following methods to measure DOC:
  - (i) Standard Method 5310 B or 5130 B-00 (High-Temperature Combustion Method).
  - (ii) Standard Method 5310 C or 5130 C-00 (Persulfate-Ultraviolet or Heated-Persulfate Oxidation Method).

- (iii) Standard Method 5310 D or 5310 D-00 (Wet-Oxidation Method).
- (iv) EPA Method 415.3, Revision 1.1.
- (B) DOC samples must be filtered through a forty-five hundredths (0.45) micrometer pore-diameter filter as soon as practical after sampling, not to exceed forty-eight (48) hours. After filtration, DOC samples must be acidified to achieve pH least than or equal to two (2.0) with minimal addition of the acid specified in the method or by the instrument manufacturer. Acidified DOC samples must be analyzed within twenty-eight (28) days of sample collection. Inorganic carbon must be removed from the samples prior to analysis. Water passed through the filter prior to filtration of the sample must serve as the filtered blank. This filtered blank must be analyzed using procedures identical to those used for analysis of the samples and must meet DOC that is less than five-tenths (0.5) milligram per liter.
- (C) The following apply to a system required to measure  $UV_{254}$  under this subdivision:
  - (i) A system shall use Standard Method 5910 B or 5910 B-00 (Ultraviolet Absorption Method) or EPA Method 415.3, Revision 1.1 to measure ultraviolet absorption at two hundred fifty-four (254) nanometers ( $UV_{254}$ ). UV absorption must be measured at two hundred fifty-three and seven-tenths (253.7) nanometers (may be rounded off to two hundred fifty-four (254) nanometers).
  - (ii) Prior to analysis,  $UV_{254}$  samples must be filtered through a forty-five hundredths (0.45) micrometer pore-diameter filter.
  - (iii) The pH of  $UV_{254}$  samples may not be adjusted.
  - (iv) Samples must be analyzed as soon as practical after sampling, not to exceed forty-eight (48) hours. SUVA must be determined on water prior to the addition of disinfectants or oxidants, or both, by the system. DOC and  $UV_{254}$  samples used to determine a SUVA value must be taken at the same time and at the same location.
- (5) A system required to measure for magnesium under this subsection shall use one (1) of the following methods for magnesium:
  - (A) EPA Method 200.7.
  - (B) ASTM Method D 511-93 A or D 511-93 B.
  - (C) Standard Method 3111 B, 3120 B, 3500-Mg B, or 3500-Mg E.

(e) Parameters measured under subsection (d) must be measured by a certified operator or a party approved by the commissioner.

(Water Pollution Control Board; [327 IAC 8-2.5-5](#); filed May 1, 2003, 12:00 p.m.: 26 IR 2841; errata filed Feb 6, 2006, 11:15 a.m.: 29 IR 1937; filed May 7, 2010, 9:30 a.m.: [20100602-IR-327080198FRA](#); errata filed Jul 2, 2010, 1:12 p.m.: [20100714-IR-327100432ACA](#))

SECTION 10. [327 IAC 8-2.5-12](#) IS AMENDED TO READ AS FOLLOWS:

**[327 IAC 8-2.5-12](#) Routine monitoring; stage 2 disinfection byproducts requirements**

**Authority:** [IC 13-13-5](#); [IC 13-14-8-7](#); [IC 13-14-9](#); [IC 13-18-3-2](#); [IC 13-18-16](#)

**Affected:** [IC 13-18-3-11](#)

Sec. 12. (a) The following are the routine monitoring requirements for a PWS to comply with section 11 of this rule, this section, and sections 13 through 20 of this rule:

- (1) A PWS shall comply with monitoring location and schedule requirements as follows:
  - (A) If a PWS submitted an initial distribution system evaluation (IDSE) report as required under section 10 of this rule, the PWS shall:
    - (i) begin monitoring at the locations and months:
      - (AA) recommended in the IDSE report submitted under 40 CFR 141.605, as incorporated by reference in section 10(a)(6) of this rule; and
      - (BB) following the schedule in section 11(c) of this rule; or
    - (ii) monitor according to the directive of the:
      - (AA) commissioner; or
      - (BB) EPA;if either requires other locations or additional locations after review of the PWS's IDSE report.
  - (B) A PWS shall monitor at the location or locations and dates identified in the monitoring plan submitted in accordance with section 6(f) of this rule and updated as required by section 13 of this rule if the PWS meets one (1) of the following:
    - (i) The PWS submitted a 40/30 certification under 40 CFR 141.603, as incorporated by reference in section

10(a)(4) of this rule.

(ii) The PWS qualified for a very small system waiver under 40 CFR 141.604, as incorporated by reference in section 10(a)(5) of this rule.

(iii) The PWS is an NTNCWS serving fewer than ten thousand (10,000) people.

(2) A PWS shall monitor at not fewer than the number of locations identified in the following table:

Table 12			
Source Water Type	Population Size Category	Monitoring Frequency <sup>1</sup>	Distribution System Monitoring Locations Total per Monitoring Period <sup>2</sup>
Subpart H	< 500	per year	2
	500-3,300	per quarter	2
	3,301-9,999	per quarter	2
	10,000-49,999	per quarter	4
	50,000-249,999	per quarter	8
	250,000-999,999	per quarter	12
	1,000,000-4,999,999	per quarter	16
	≥ 5,000,000	per quarter	20
Ground water	< 500	per year	2
	500-9,999	per year	2
	10,000-99,999	per quarter	4
	100,000-499,999	per quarter	6
	≥ 500,000	per quarter	8

<sup>1</sup> All systems must monitor during month of highest DBP concentrations.

<sup>2</sup> Systems on quarterly monitoring must take dual sample sets every 90 days at each monitoring location, except for Subpart H systems serving 500-3,300. Ground water systems serving 500-9,999 on annual monitoring must take dual sample sets at each monitoring location. All other systems on annual monitoring and Subpart H systems serving 500-3,300 are required to take individual TTHM and HAA5 samples (instead of a dual sample set) at the locations with the highest TTHM and HAA5 concentrations, respectively. For systems serving fewer than 500 people, only one location with a dual sample set per monitoring period is needed if the highest TTHM and HAA5 concentrations occur at the same location and month.

(3) If an undisinfected PWS begins using a disinfectant other than UV light after the dates according to 40 CFR 141.600 through 40 CFR 141.605, as incorporated in section 10(a)(6) of this rule, for complying with the IDSE requirements, the PWS shall do the following:

(A) Consult with the commissioner to identify compliance monitoring locations for section 11 of this rule, this section, and sections 13 through 20 of this rule.

(B) Develop a monitoring plan under section 13 of this rule that includes the monitoring locations identified under clause (A).

(b) A PWS shall use analytical methods approved under section 5 of this rule for TTHM and HAA5 analyses in section 11 of this rule, this section, and sections 13 through 20 of this rule. Analyses must be conducted by laboratories that have received certification by EPA or the commissioner as specified in section 5 of this rule.

(Water Pollution Control Board; [327 IAC 8-2.5-12](#); filed May 7, 2010, 9:30 a.m.: [20100602-IR-327080198FRA](#))

### [Notice of Public Hearing](#)

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